Chemical Week

January 11, 1958

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Trouble ahead in Ohio valley. Industry girds against harsh new pollution proposals . . . . . p. 20

Cloverine's Wilson: His teen-age sales team powers $1-million/year specialties business . . . . p. 30

Trying to cut production costs? Good reason for a new look at the industrial engineer . . . p. 39

Gibberellin today: Some of the luster is gone, but there's still solid base for growth . . . p. 59

Refrigerant makers shuffle sales forces for coming season's h[illegible] competition . . . . . p. 85

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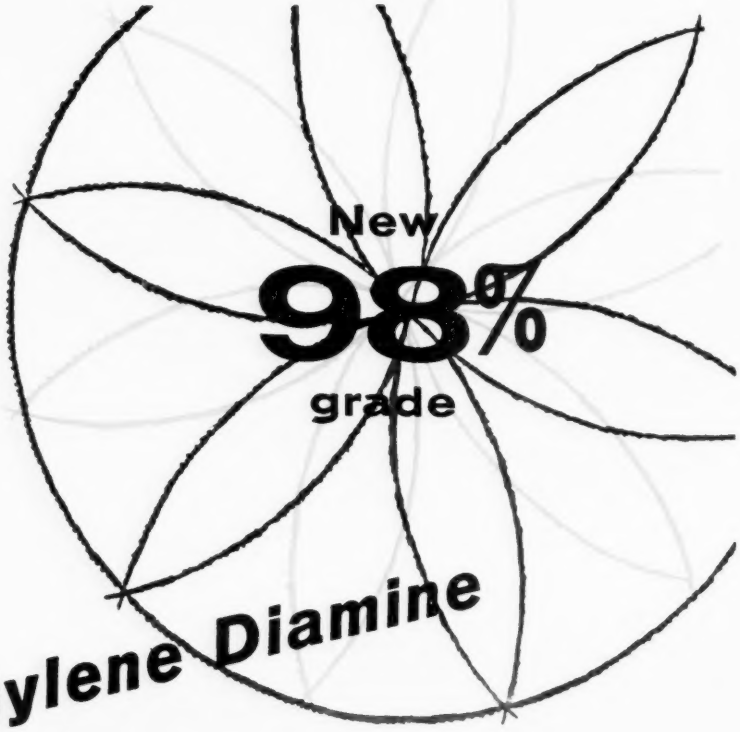

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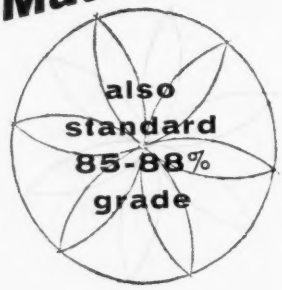

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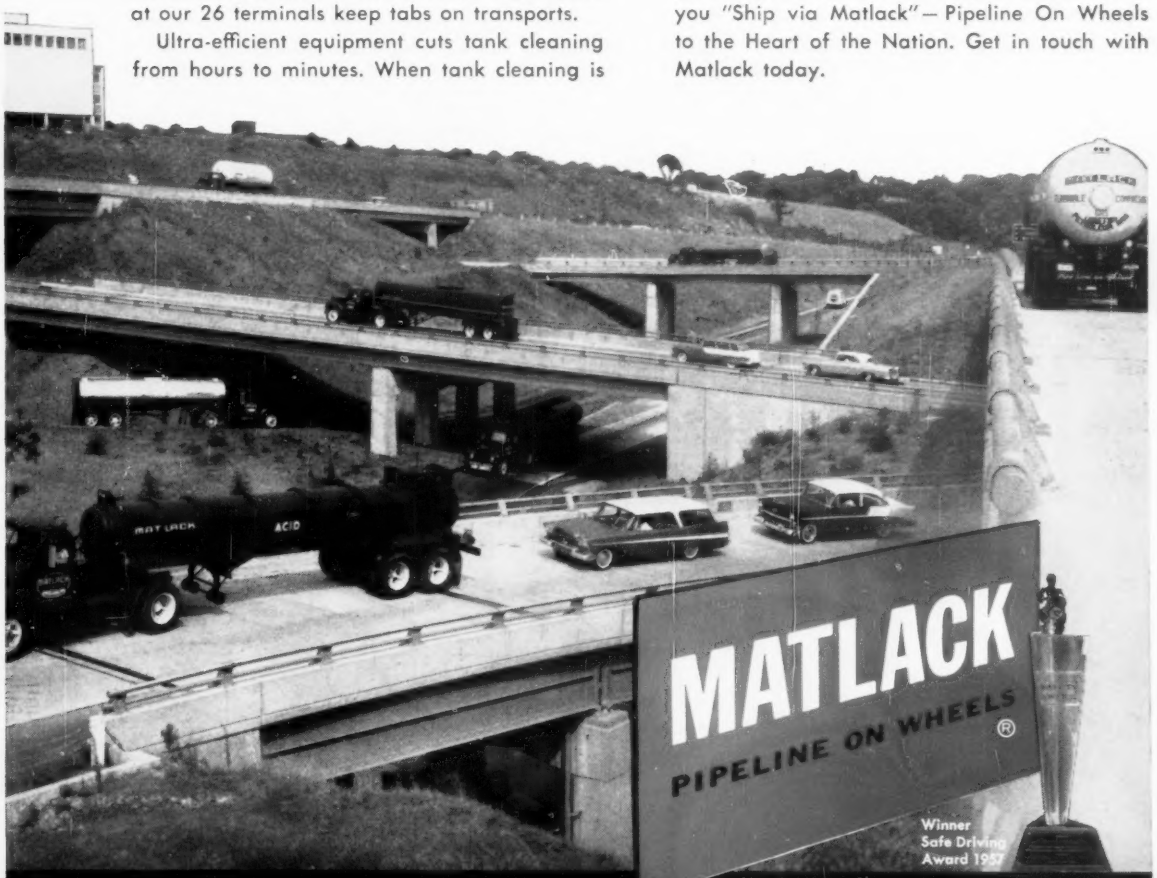

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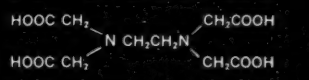

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Molecular weight . . . 292
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Bulk Density . . . 0.68
pH, aqueous solution . . . 2.0
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Residue on ignition . . . 0.03% max.
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Calcium	0.004
Potassium	0.003
Barium	0.003
Aluminum	0.001
Chromium	0.001
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Silicon	0.0005
Copper	0.0003
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Chemical Week

TOP OF THE WEEK

January 11, 1958

- **British success in selling students on science** may help guide U. S. technical education programs ..... **p. 49**
- **Continuous process for refining cobalt makes its bow;** pluses: low-cost operation, boosted output ..... **p. 69**
- **Liquefied petroleum gas prospects are bright for next decade** but shifting markets are creating problems now ..... **p. 79**

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15 **MEETING**

17 **BUSINESS NEWSLETTER**

20 Stringent pollution-control laws loom for chemical plants in the Ohio River basin. CPI's stand: the measures are not needed; permissible contaminant limits are unrealistic.

21 Minority stockholders seek court aid to block Climax Molybdenum, American Metals merger.

22 First licenses on new liquid fertilizer process highlight TVA's process industry dealings.

22 Justice Dept. orders Crown Zellerbach to get rid of St. Helens Paper Co. stock, takes closer look at newsprint price policies.

27 **WASHINGTON NEWSLETTER**

30 **SPECIALTIES**

A sales staff of 300,000, paid off in premiums, brings $1-million/year business to Wilson Chemical Co.

39 **PRODUCTION**

Trying industrial engineering to improve production efficiency? More chemical companies are using this approach to cost-cutting.

42 Allied's Solvay Division builds a loading station on a flat car to beat problem of replacing still-in-use unit.

49 **ADMINISTRATION**

British demonstrate how to whet students' appetite for science in large-scale program at girls' school.

50 Technical help's the backbone of your plant operation. How to keep it happy? Survey offers some guides.

54 Look for new, coordinating role for AFL-CIO labor information group.

59 **RESEARCH**

Research is outlining the role of gibberellin in agriculture. Potentials lie in improved and larger crop strains.

63 New instrument provides rapid information on rate of solvent evaporation.

65 **TECHNOLOGY NEWSLETTER**

68 **ENGINEERING**

Calera Mining Co. shows off new low-cost, boosted-capacity cobalt process. Key: electrowinning rather than hydrogen reduction of cobalt.

70 Argonne Labs. doubles heat output of its experimental boiling-water nuclear reactor.

75 **MARKET NEWSLETTER**

79 **MARKETS**

Liquefied petroleum gas sales are climbing, and future's good. But changes in demands by various industries makes market predictions tough.

82 Ethylene glycol output and consumption surges, boosted by still-growing export market.

85 **SALES**

Major shifts in sales organizations for refrigerant gases spells hot market competition—due to get hotter when fourth supplier bows.

92 **CHARTING BUSINESS**

Canada looks like a golden chemical market area by 1980.

Vol. 82
No. 2

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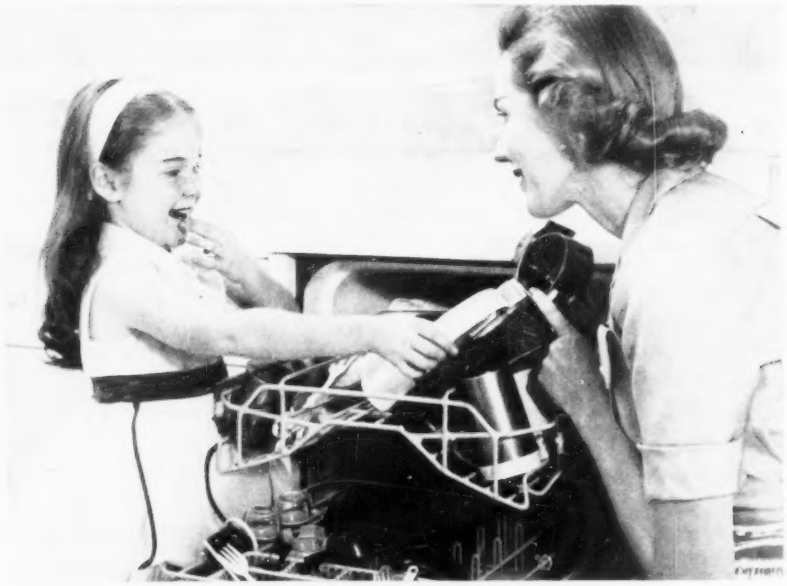

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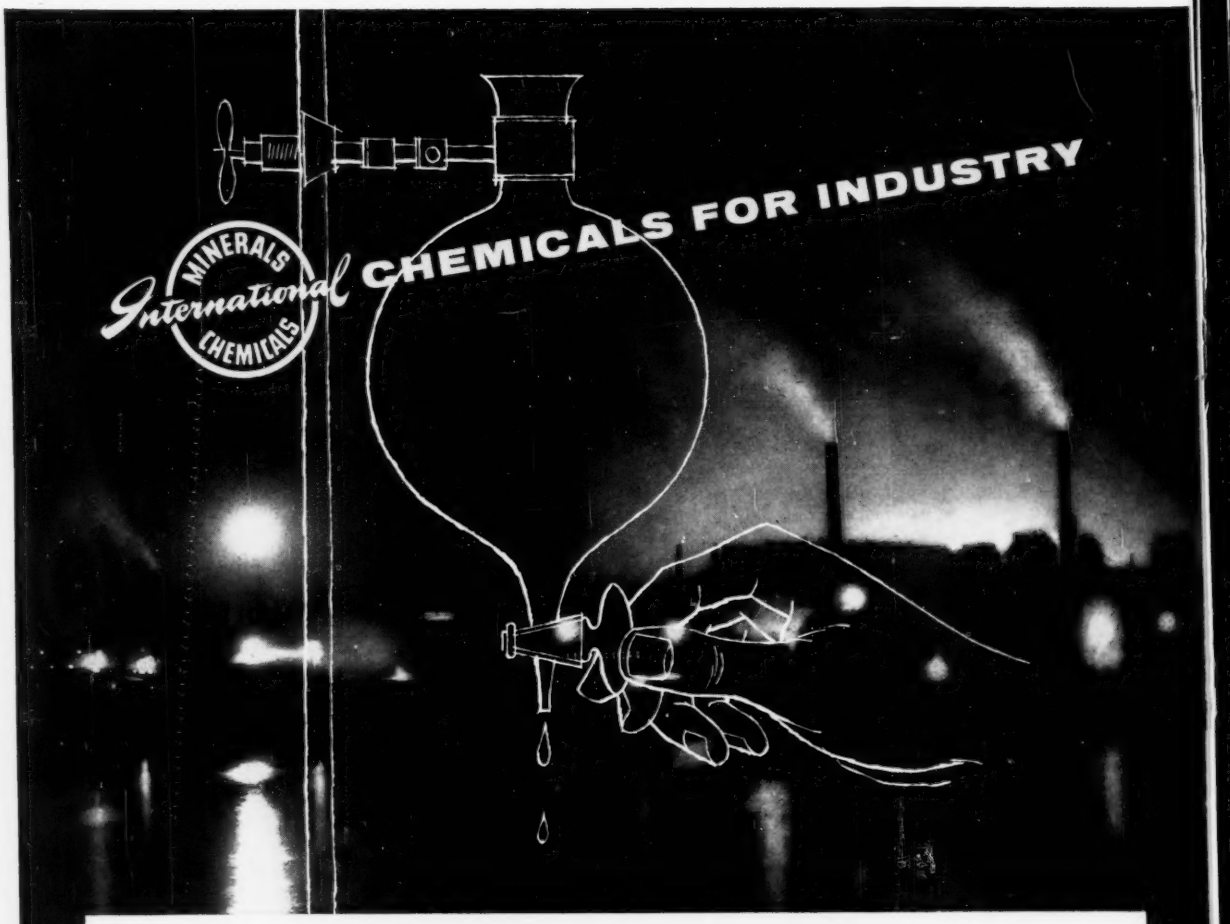

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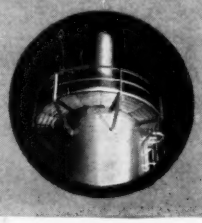
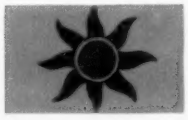


IN POLYESTERS STABLE NEOPENTYL GLYCOL MEANS BETTER RESISTANCE TO WATER HEAT &  SUNLIGHT

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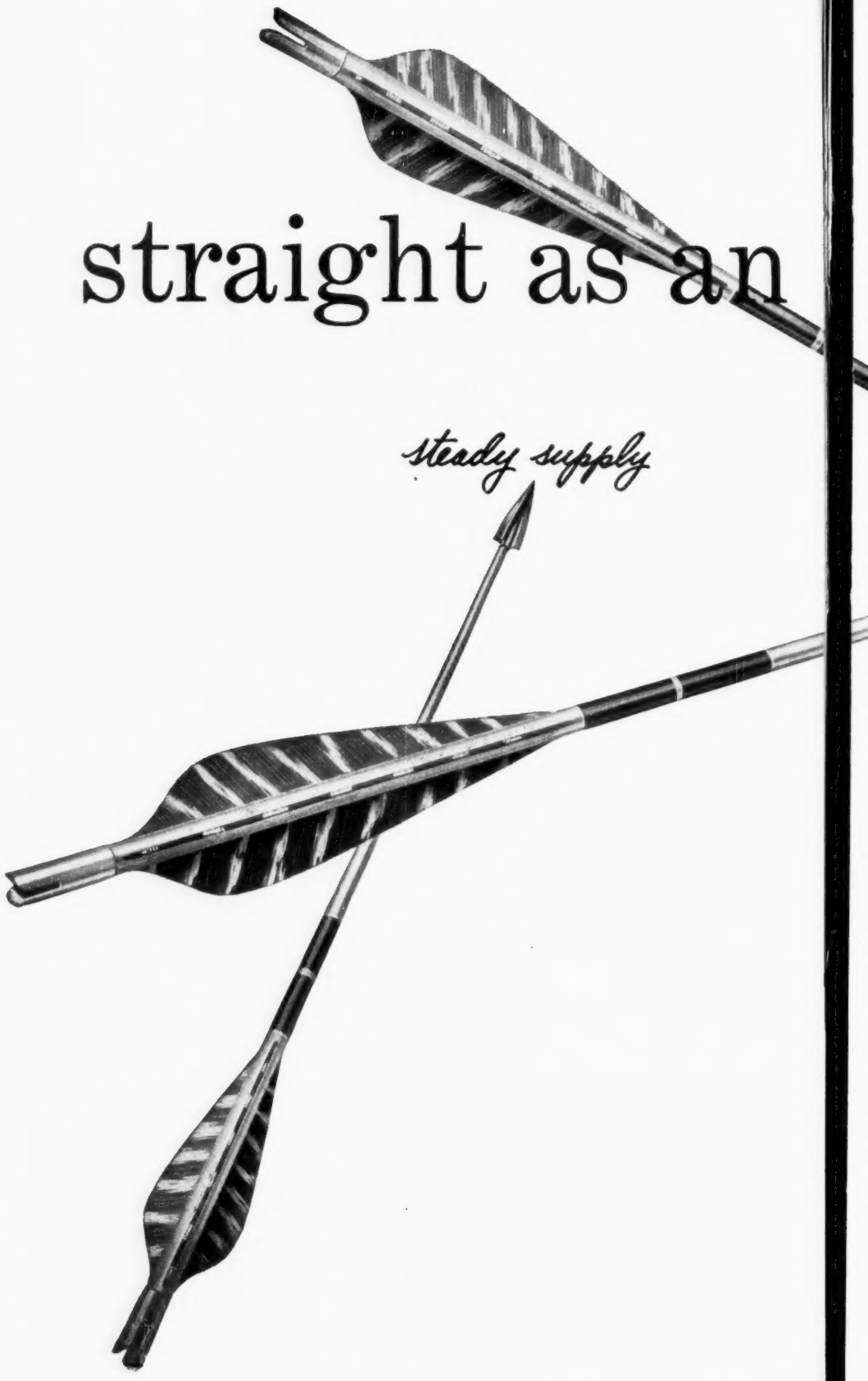

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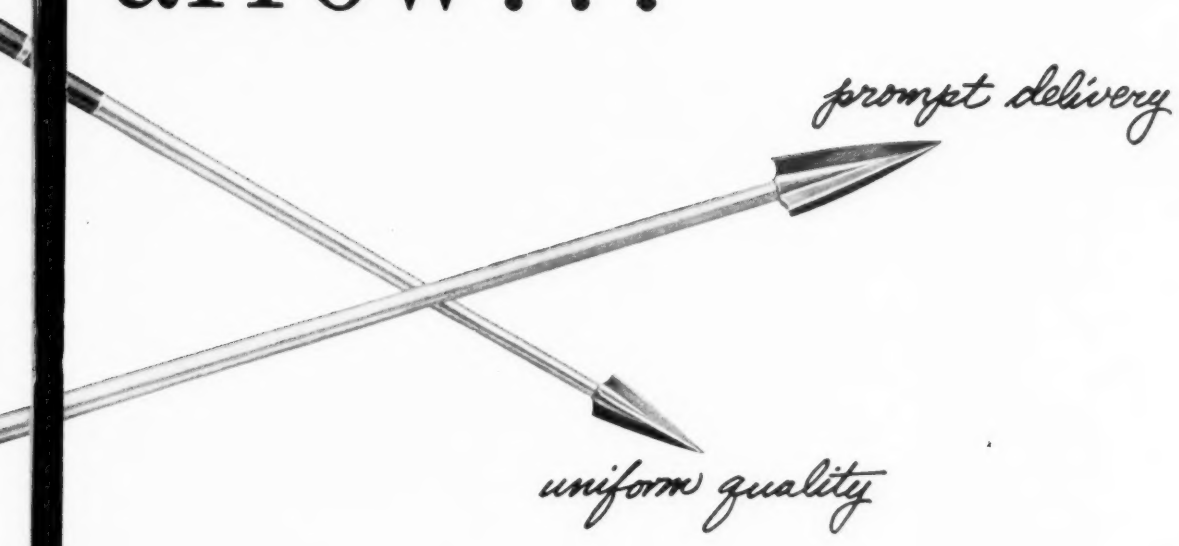

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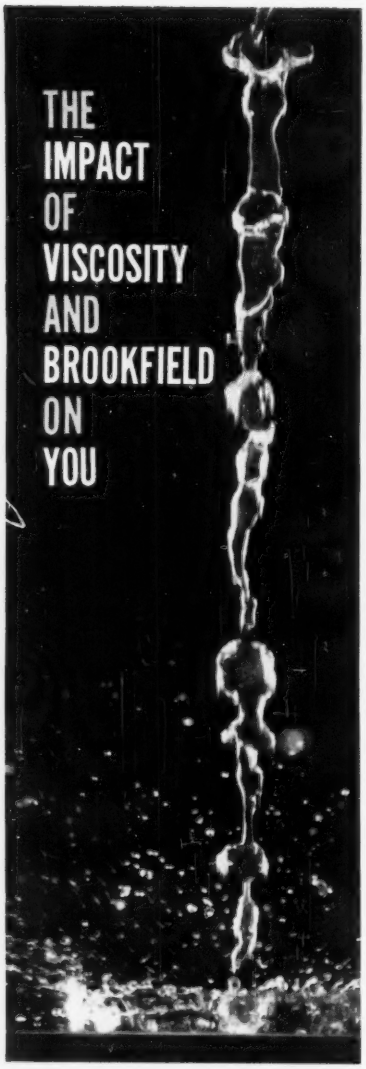

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Advertising Salesmen ..... See page 89

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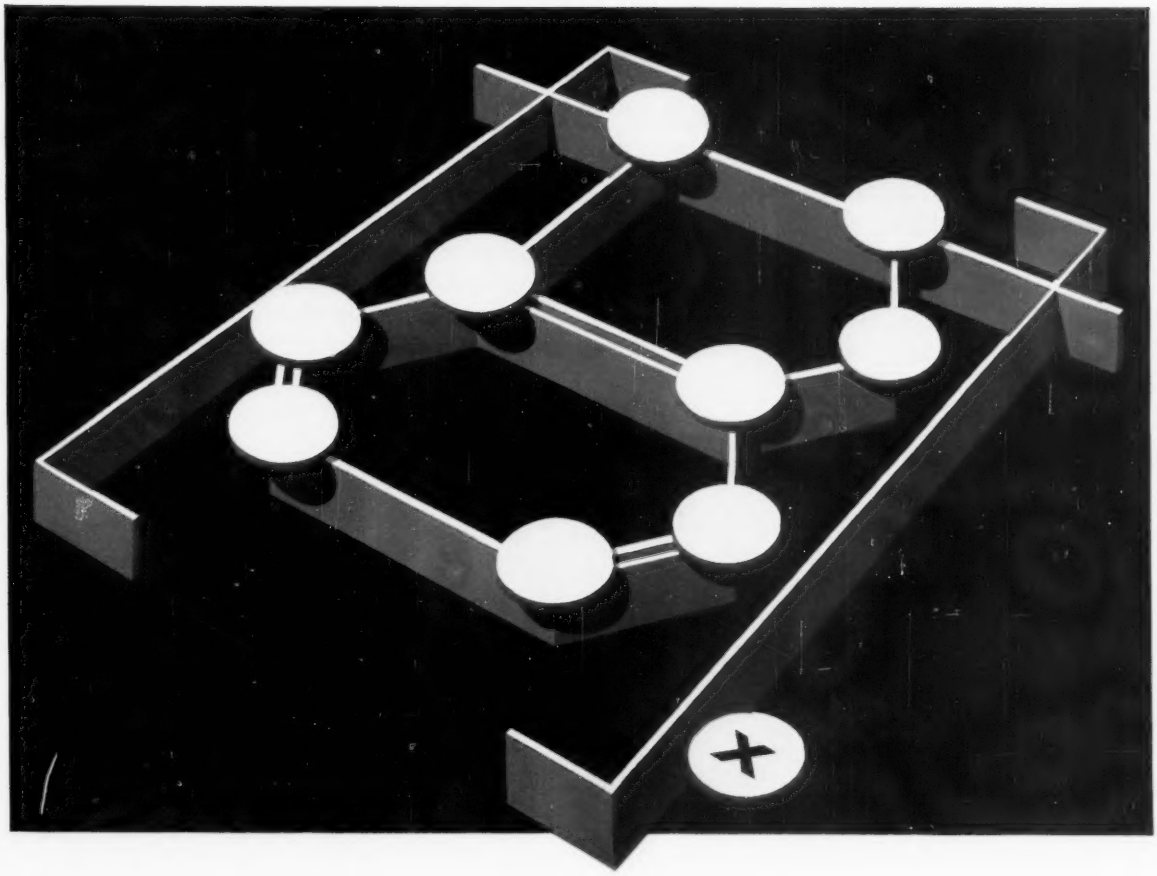

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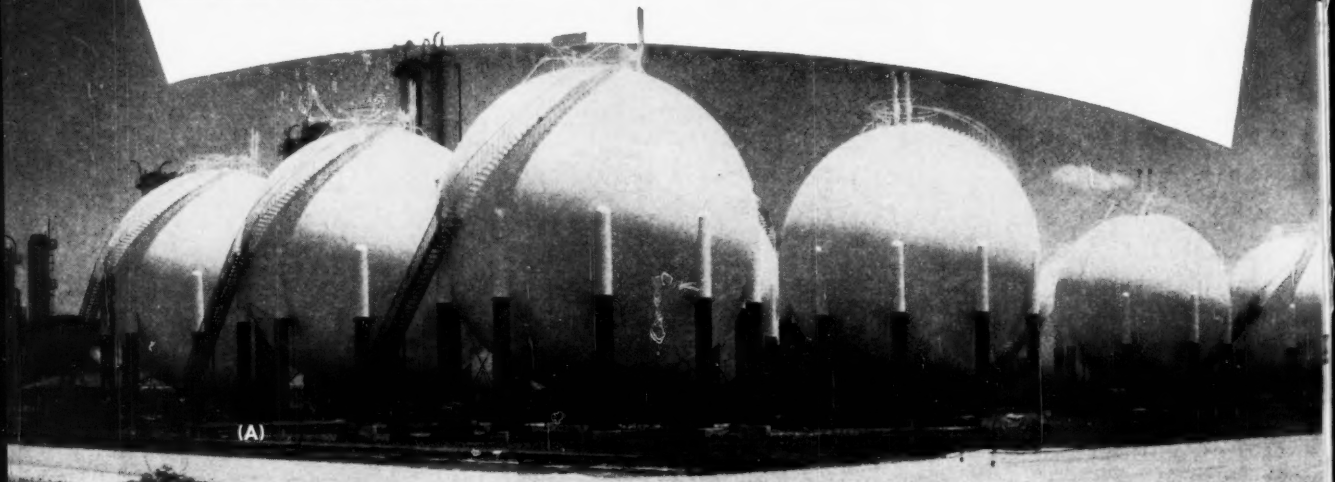

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P61CB

OPINION

Smoggy Doggerel

TO THE EDITOR: The item on page 28 of the Nov. 9 issue incited (note I do not presume to say "inspired") the following:

Man sometime sees a way to double
His profits, even from his trouble.
We marvel at the sort of man
Who sells smog at so much a can.
It seems a most amazing act,
Yet CHEM WEEK offers it as fact.
He must be kin to those who try
To sell the suckers bright blue sky.

CARL S. MINER
Consulting Chemist
Chicago

Foam Concretes

TO THE EDITOR: From your article on gas concrete (*CW, Oct. 5, p. 79*), the reader would assume that Mearlcrete is a single product. Mearlcrete is actually a trademarked term applied to a wide range of uniquely prepared foam concretes covering the density range from 10 to 120 lbs. per cu. ft. The particular virtue of this Mearlcrete system is that products may be designed in accord with desired properties.

Made by blending the concrete paste with a preformed foam from a controlled protein hydrolysate, Mearlcrete foam concrete may then be cast and cured-in-place on the job site or may be precast in a concrete products plant. Foam concretes are designed according to their end-use, and curing techniques chosen accordingly.

Plant-produced foam concretes may be divided into two categories depending on the method of curing. Autoclave-curing of concretes in saturated steam at pressures of 125 psi. or greater, for six hours or more, results in the formation of hydrous monocalcium silicates. These concretes have greater compressive strengths and lower shrinkage values at equal densities than concretes that are moist-cured by the more conventional method, at ambient temperatures for 28 days. Autoclaved Mearlcrete, along with Durox and the other autoclaved products mentioned in the article, exhibits this difference, so that it is incorrect to state that at the same density range Mearlcrete has a lower compressive strength, without specifying the curing method.

In addition to differences resulting from variations in curing methods and the chemical composition of the cementitious components, the method of introducing the air or gas bubbles has an effect on the compressive strength. Since the foam method depends on mechanically blending foam into the concrete slurry, no further expansion occurs once this foamed concrete paste has been placed in molds or forms. The gas method, similar to the "blowing" of plastics, depends on upward expansion after placement in molds so that bubbles may be somewhat flattened, leading to strength differences with changes in direction of loading.

For many applications, the use of conventional curing of foam concrete gives more than adequate strength to make an attractive building material. The low-density products have excellent thermal insulating qualities, making possible their use as a poured-in-place fill for underground pipelines, cold-storage facilities and roof fill on structural decks, while the higher-density concretes are primarily used structurally. Intermediate densities, around 40 lbs./cu. ft., provide a compromise between the two. This latter product is used as floor fill and as an economical, monolithically poured, insulating and structural fire-resistant roof deck for schools, hospitals and industrial buildings.

L. E. RIVKIND
Mearl Manufacturing Corp.
Research and Development Laboratories
Roselle Park, N.J.

MEETINGS

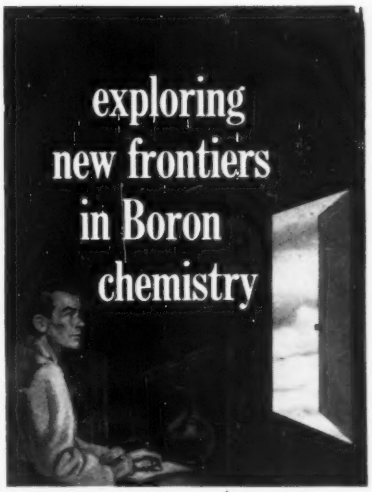
American Management Assn., conference on how to plan products that sell, Roosevelt Hotel, New York, Jan. 13-15.

Compressed Gas Assn., 45th annual meeting, Waldorf-Astoria, New York, Jan. 20-21.

Soap Industry Convention, Waldorf-Astoria, New York, Jan. 22-24.

Plant Maintenance and Engineering Show, International Amphitheatre, Chicago, Jan. 27-30.

Society of Plastics Engineers, meeting on Progress through Plastics Engineering, Sheraton-Cadillac Hotel, Detroit, Jan. 28-31.



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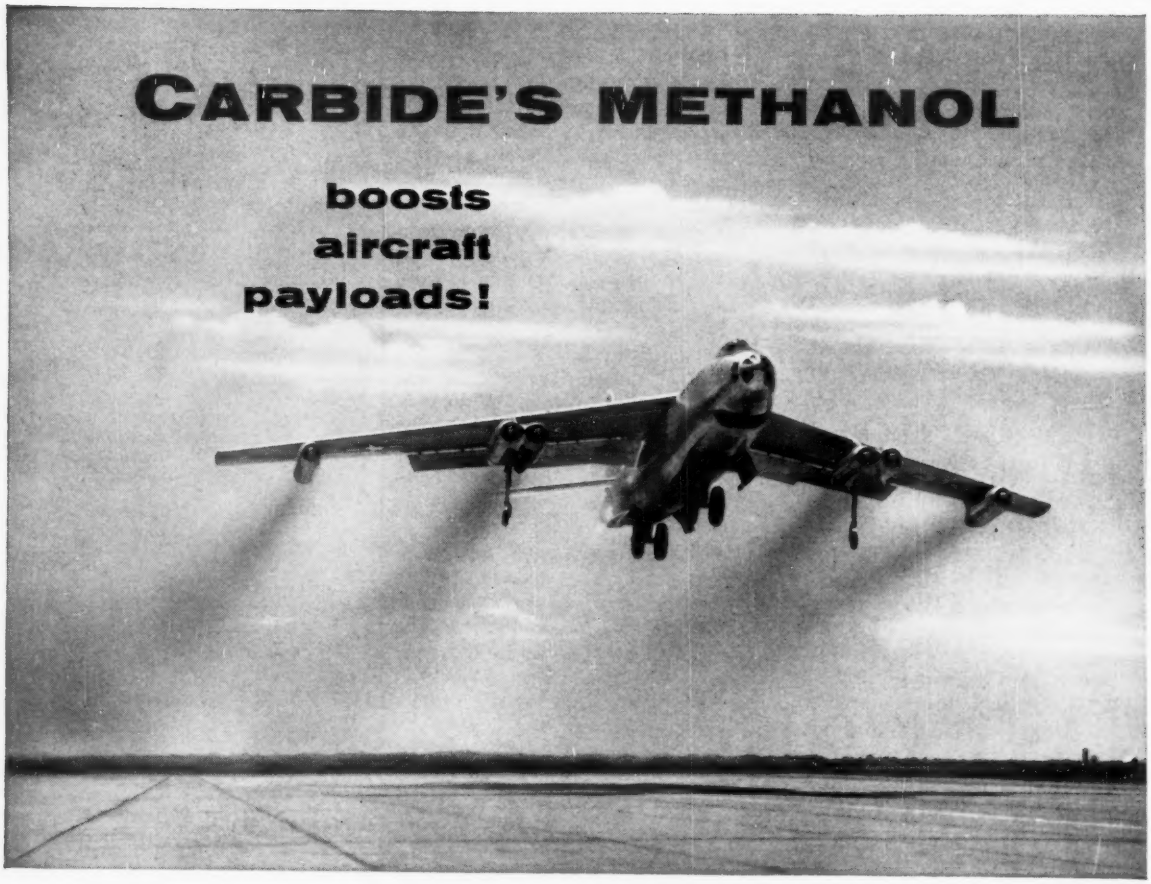

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Photo Courtesy of United States Air Force.

Business
Newsletter

CHEMICAL WEEK
January 11, 1958

Though a continuing sprinkle of layoff and cutback moves may presage lower earnings for some firms in the first half of '58, the week brought strong indications that the long-term outlook for chemical industries is a bullish one. Specific examples:

• Morton Salt Co. (Chicago), prompted by its expanding chemical business and confidence in the chemical industry's future, is consolidating its chemical activities into a new subsidiary, Morton Chemical Co.

• Union Carbide Canada Ltd.—now taking over the business of Visking Ltd.—says it will keep right on expanding during '58 and that it expects this year's sales and earnings to equal those of '57.

Investors' confidence in chemicals is indicated by the fact that chemical stocks fared considerably better than the over-all average for "Big Board" shares in the declining market of the past six months. The brokerage firm Hemphill, Noyes & Co. notes that American Cyanamid, Hercules Powder and Spencer Chemical stock prices bucked the trend; and that pharmaceuticals as a group rose by 23.8%, while the market as a whole slumped by about 15%.

•

Over in Europe, chemical business is booming.

Farbenfabriken Bayer—largest of West Germany's I. G. Farben successor companies—expects its final accounting for '57 to show a 16% increase in sales; total will be about $440 million. Of that amount, about 41% came from exports. Capital investment in the company's German facilities last year came to more than $60 million; and further expansion is indicated by Bayer's plans to sell $47.6 million worth of new stock next month.

And Royal Dutch Shell—now offering additional stock to shareholders on a one-for-eight basis—is counting on the forthcoming common market in Europe (Euromarket) as a promising outlet for the synthetic rubber it will produce at a new plant at Pernis, near Rotterdam. Shell figures the unit, for economic reasons, should have at least a 50,000-tons/year capacity. It expects to sell 13,000 tons/year in the Netherlands, hopes that the Euromarket will absorb nearly all of the remaining output.

•

The ultimate constitutional test of the "hot cargo clause" in Teamster Union labor contracts may be provided by a chemical industry case. The U.S. Supreme Court has been asked to rule on the legality of picketing by Teamster members against companies doing business with Scobell Chemical Co. (Rochester, N.Y.). Teamster Local 118—in its so-far-unsuccessful attempt to organize Scobell's truck drivers—has been picketing the Scobell plant since last March 29; and has asserted that it has the right to conduct roving or secondary picketing at plants that deal

with Scobell. Other aspects of the dispute are pending before the National Labor Relations Board's Buffalo office and the U.S. District Court at Rochester.

•

Are tranquilizers emptying our mental institutions? Higher rates of discharge of "cured" patients since the drugs were introduced a few years ago have been widely attributed to the use of the tranquilizers in treating mental illnesses. But the government's National Institutes of Mental Health—engaged in a long-range evaluation of mental drugs—is said to be sitting on a report possibly unfavorable to the new drugs. It is said to show an unexpectedly high readmission rate among patients who were discharged as cured by some of the mental institutions that have leaned most heavily on tranquilizer therapy.

•

And drug manufacturers are facing a Congressional quiz—this time into their promotion of tranquilizer drugs, one of the biggest earners among current ethical drug products. Rep. John Blatnik's House Government Operations Subcommittee is looking over promotional material submitted at his request by all producers of these drugs. The Duluth Democrat is talking of public hearings in February on such controversial issues as the use of these drugs for treating everyday tensions. Dr. Nathan Kline, of Rockland State Hospital, has been talking with industry executives and other experts about the problem—will soon report to Blatnik. Kline, a pioneer in using tranquilizers for mental hospital patients, reportedly feels the industry has gone too far in its promotional claims. Blatnik will ask the Food & Drug Administration whether it feels that sales of such drugs should be limited to the more serious emotional conditions.

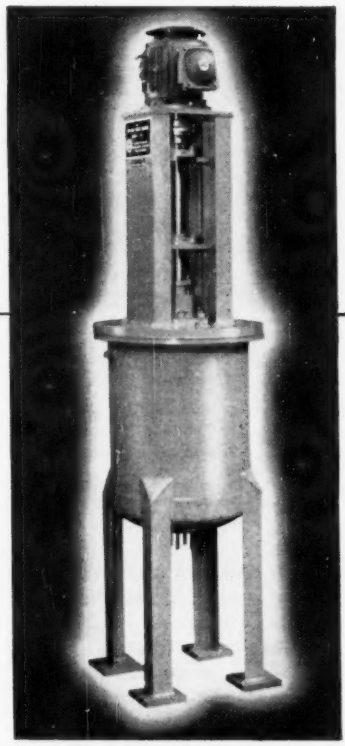
•

Vital decisions on policing of industry as a means of curbing stream pollution may come this year. It's suggested by events in western New York state as well as in the Ohio Valley (*p. 20*).

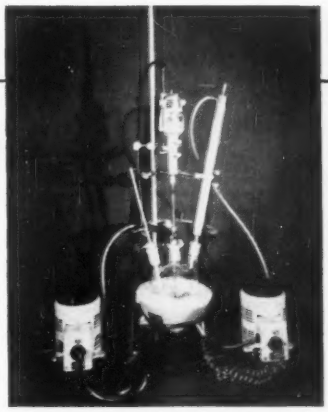
At Albany, a state supreme court justice, Isadore Bookstein, has ruled that the state's water pollution control board has the authority to bring the city of Utica and some 35 industrial companies to book on charges of polluting the waters of the Mohawk River and the state barge canal. Utica had contended that the state law setting up the control board was not in accord with the New York constitution. The city may appeal to a higher court.

And at Rochester, citizens became alarmed when the waters of the Genessee River—normally a muddy brown—turned bright red and then brown again. The city's chemist, John Temmerman, said the sudden reddening was caused by dye and solvent wastes from a plant that produces gift wrapping papers. The plant manager explained that he has not yet been told of any requirements on discharge into the stream. State health engineers are expected to draw up a pollution abatement plan next spring.

MAKE YOUR OWN SODIUM DISPERSIONS



25 gal. Dispersion Unit and Auxiliary Equipment. Courtesy: Industrial Process Engineers



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CW 1-8-58

Chemical Week

Along Ohio River, process industry management is concerned about effects of proposed formula to

Pollution Control Plan Stirs Apprehension

ISSUES IN OHIO RIVER CHLORIDE CONTROL

ORSANCO Staff's PROPOSALS	Chemical Industry's REPLIES
1—On over-all need for control program:	
• In one stretch of the river, undesirable concentrations are being approached. Periods of water quality impairment will be more frequent as a result of industrial expansion throughout this area.	• It's questionable whether a chloride problem exists now. In 1952-54 testing program, maximum daily chloride concentration was only 152 ppm.; reading was below 100 ppm. on all but 28 days.
• But with a control program based on proportionate discharge, chloride-bearing wastes can be accommodated without sacrificing desired quality conditions.	• Impounding of wastes—as is to be done at Barberton, O.—can do much to eliminate high daily chloride concentration. Discharges would be coordinated with river flow.
2—On recommendations for action:	
• The commission should adopt a control program that would limit chloride concentration in the Ohio River at points of use to: a monthly average of 125 ppm., except in case of severe drought; maximum of 250 ppm. at any time.	• This lower limit is unnecessarily restrictive and would tend to halt industrial development of the Ohio River basin. This dual criterion—monthly average and daily maximum—is not practical to apply to discharge into tributaries.

A new and controversial idea in stream-pollution control will go on trial at Cincinnati next week. If it holds sway, it could swiftly become a basic factor in all future chemical process industry operations and planning.

According to the scheme in question, rights to discharge industrial wastes would be allotted on the basis of seasonal variations in stream flow in each tributary throughout an entire river basin; the heavier the flow, the more waste the stream would be allowed to carry.

The first specific proposal of this kind—a plan to regulate the discharge of chloride-containing wastes—is now before the Ohio River Valley Water Sanitation Commission (ORSANCO). A special committee of that eight-state agency will hold a hearing on the proposal next Thursday. The full commission will probably take up the question at its quarterly meeting in early April.

Divergent Views: Proponents of this theory of "coordinated proportionate discharge"—notably Edward Cleary, ORSANCO's executive director and chief engineer—hold that it's a just, workable, economic means of making the greatest possible use of a river basin's capacity to accommodate industrial wastes. This, Cleary maintains, permits maximum industrial development within that basin.

But critics contend that the Cleary system in general and the present chloride control plan in particular have some serious shortcomings:

• Failure to realize that industrial

cut discharge of chloride wastes.

Along the Ohio

resources—e.g., availability of salt deposits and other natural resources—are seldom if ever distributed along a river's tributaries in precise proportion to the respective amounts of their runoff. The biggest plants, or the heaviest concentrations of plants are not always on the biggest streams.

• Failure to recognize that the profitable operation of certain plants may be more important to the community and the nation than holding contamination to "ideal" levels. Trying to achieve these levels would entail considerable economic sacrifice.

Objections Overruled: Cleary's chloride-control proposal stems from a resolution adopted by the commission in '55, directing Cleary and his staff to study chloride conditions in the Ohio River and draft suggestions for a control program. Why were chlorides singled out for first consideration? ORSANCO says that "abnormal amounts" of chloride sometimes found in the upper Ohio River —though not constituting any health hazard—"might result in unjustified impairment of water quality."

ORSANCO reports that another reason for concern is the increasing number of requests by industrial companies for permission to discharge chloride-bearing wastes.

In '56, ORSANCO's engineering committee heard an oral presentation of the staff-developed chloride-control proposal. At the same meeting, it considered memoranda prepared by the chemical industry committee (CIC), one of eight advisory committees set up by Ohio River valley industries to work with ORSANCO. But the engineering committee rejected CIC's two main objections,* and endorsed the staff proposal as the basis for a control program "whenever a control program is deemed necessary by the commission."

Up for Decision: By the time the chloride control plan reached the full commission last July, CIC had put together a more detailed and more fully documented report in opposition (*see table, p. 20*). In view of the decided lack of unanimity, the commission referred the plan to the special committee.

One new development that may affect next week's hearing: start of construction of an impounding reservoir designed to permit orderly release of chloride-containing wastes from Columbia-Southern Chemical's plant near Barberton, O., into the Muskingum River (*CW Business Newsletter, Jan. 4*). This plant has been the source of possibly two-thirds of the chloride content in the upper Ohio River. Accordingly, CIC members feel that prospects for operation of the reservoir before this summer may lead the committee to recommend continuing study rather than quick adoption of the chloride-control plan.

But there are factors that may lead the special committee to endorse the staff report. For one thing, the Cleary plan does offer a methodical, mathematical system for regulating discharge of industrial wastes. It would permit much more industrialization, particularly along the Ohio's main stem. Total chloride emission could rise by sevenfold. And hunting and fishing groups have been prodding ORSANCO for bold action.

Industry people feel that much is riding on ORSANCO's decision. They see this agency—now nearly 10 years old—as a pace-setter in its field. They feel that if ORSANCO lays down a hard-and-fast rule about chloride discharges, it could easily be only a matter of time before similar restrictions—covering numerous chemical waste products—are put into effect in many states and nations. Each rule, it's feared, would threaten feasibility of present or proposed plants.

*That the need for a control program had not been demonstrated, and that in any event the proposed limit—125 ppm.—was too restrictive.

To Spike a Merger

A stockholders' lawsuit aimed at spiking last week's merger of Climax Molybdenum Co. and American Metal Co. may presage a rougher road ahead for mergers in general.

In recent boom years, stockholders were easy to "sell" on merger schemes. But now that many companies' earnings have been on the downgrade, shareholders may be hard to convince.

It was only after a three-and-half hour session marked by grumbling and charges of "special interests" that Climax President Arthur Bunker won from his stockholders a vote of approval for the merger.

Climax Molybdenum's Bunker: Facing stockholders' antimerger lawsuit.

Now the minority group—holding about 17% of the outstanding shares —is asking a Delaware chancery court to block the merger on the ground that proxy information supplied to the stockholders was insufficient. Also, the insurgents assert that all but one of the Climax directors are present or former officials of American Metals, hence have conflicting interests.

Possibly more to the point, though not in litigation: the minority fears that coupling Climax, which has considerable growth-potential, to a firm whose main product—copper—has been in a price slump might well mean cheerless news at dividend time.

Strong Stand Under Fire

Industry is sticking to its guns in the face of two new governmental moves aimed at alleged violations of antitrust laws in the pulp and paper industry.

• Crown Zellerbach Corp.—largest West Coast producer in that category—says it will ask the U.S. Court of Appeals to overturn the Federal Trade Commission's ruling of late last week that CZ must divest itself of the assets of the former St. Helens Pulp & Paper Corp. It's the first "unscrambling a merger" order to be made under the 1950 antimerger amendment to the Clayton Act.

• West Coast paper makers are preparing to battle a possible suit arising from the Justice Dept.'s Antitrust Division disclosure that its investigators have just launched a fact-finding mission concerning pricing practices of various newsprint makers. Antitrust chief Victor Hansen—whose staff contends that newsprint prices "seem to go up uniformly at the same time"—says the probe will cover several large U.S. companies with Canadian interests.

Findings to Be Aired: Hansen hasn't decided yet whether to file a suit against the firms. But officials say that even if no legal action results, investigators will make their findings known in a quarterly report to be given to Congress by the Attorney General as required under the Defense Production Act.

WIDE WORLD

Antitrust chief Hansen launches probe of newsprint pricing.

CW queried West Coast paper interests on what line of defense the industry would take in the event of a suit. Until definite charges are filed, companies are withholding comment.

In the St. Helens-Crown Zellerbach merger case, FTC has demanded that CZ undo the four-year-old merger—and do it all at once, not through a piecemeal process. CZ has 60 days to get rid of the company, and in the meantime can't sell, cut or distribute any of the Oregon firm's timber. Late last week, company President Alfred Layton said CZ is confident that the courts will uphold the legality of the merger. It's believed the company will pattern its defense on a decision expected soon from Federal Judge Edward Weinfeld (New York) in the now-pending Bethlehem-Youngstown Steel merger case.

Tougher Antimerger Stand: But despite CZ's decision to appeal, all concerned agree that the FTC order is charged with meaning. While it's not the first time FTC has blocked a merger, it is the first case on record in which a divesture order followed an appeal from a hearing examiner's preliminary decision—and it could herald a much tougher stand on merger cases.

FTC's past policy has been to prevent mergers by mutual consent decrees with the firms involved. Last February, Examiner Earl Kolb ruled against the CZ-St. Helens merger on grounds that it would lessen competition. Crown Zellerbach argued that Kolb had erred in limiting the "effective area" of competition to the Western market. The company asked that the merger be re-examined on the basis of competition throughout the country.

But Kolb refused, saying Eastern producers were at a disadvantage in the Western market because of freight expenses and because of the preference among Western consumers for Western products.

CZ then appealed. Now that the full commission has turned thumbs down and ordered CZ to part with the Oregon firm, observers are viewing the decision as a precedent for literal reading of antimerger laws. Moreover, the decision is expected to affect a flock of mergers now being probed—including Procter & Gamble's acquisition of Clorox Chemical Co. (*CW Business Newsletter, Aug. 3, '57*).

TVA: Closer Tie to CPI

First royalty-free licenses on a new process for making liquid ammonia-phosphoric fertilizer have just been granted by Tennessee Valley Authority. And TVA is now construcing a demonstration-scale plant to test another process—to make fertilizer from Florida leached-zone phosphate ore discarded in mining operations.

First licensees on the liquid fertilizer process are J. C. Carlile Corp. (Denver); Davison Chemical Division (Baltimore), W. R. Grace & Co.; and West Kentucky Liquid Fertilizer Co. (Hopkinsville, Ky.). Throughout the past fiscal year, TVA issued 25 royalty-free licenses to chemical and equipment manufacturers for use of other patented processes.

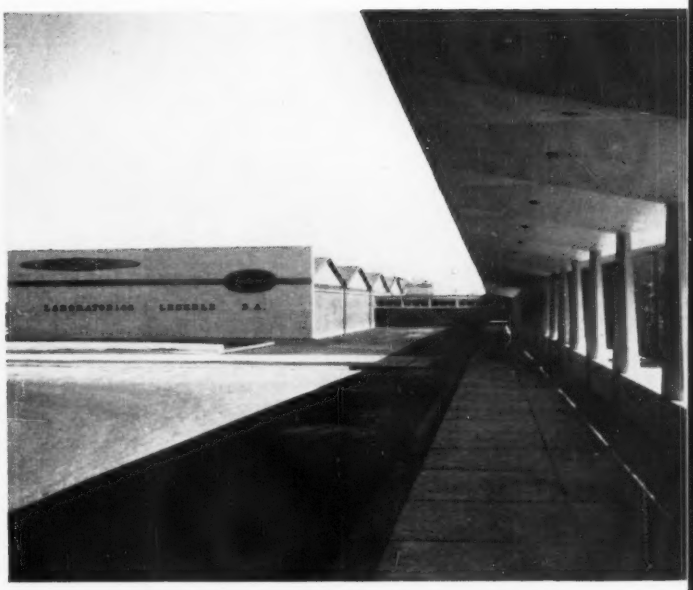
'57 Report: The last three licenses were granted just before the agency made its report on its '57 activities. And processing agreements were just a few of its contacts with chemical process industries:

• Last winter, TVA flood control structures averted damage to Bowaters Southern's newsprint mill near Calhoun, Tenn.

• Process industries' direct-purchase consumption of TVA electric power rose about 9% to a '57 total of nearly 8 billion kilowatt-hours. Rates ranged from 3.11 to 5.34 mills per kwh. New power contracts were negotiated with seven large chemical process concerns.

• TVA last year sharply cut its output of concentrated superphosphate, now being produced by private industry. But TVA boosted its production of several newer fertilizers. Over-all, about 286,700 tons of fertilizers were shipped from TVA chemical plants; and 87.4% of its output went to farm-test demonstration projects conducted in cooperation with various agricultural colleges.

TVA tells *CW* that new electric generating capacity—under construction and planned—is expected to be adequate for expanding industries in the area through 1960-61.



SYD KARSEN

Cyanamid International's Moody would like to bring number of overseas specialties plants up to 10.

Setting Sites on More Overseas Plants

American Cyanamid is finding new encouragement in the prospects for the European common market, and the growing industrialization of Europe. Cyanamid last week told CW that it's looking toward the probability of constructing as many as four plants overseas within the next two to three years.

Cyanamid, of course, already has a string of plants in foreign countries.

This expansion reflects the optimism that attended last week's formation of a new foreign division to be known as Cyanamid International (*CW Business Newsletter, Jan. 4*). All overseas marketing and production operations for 80 countries will be coordinated under the new branch. Cyanamid's foreign investments are expected to rise steadily as new plants and marketing operations take shape.

Voicing the optimistic plans for Cyanamid International was Vice-President Sidney Moody, formerly in charge of personnel, who took over direction of the whole operation just before year-end. Moody—who made Phi Beta Kappa at Williams College in 1917—joined Calco Chemical in 1919, a decade before its merger with Cyanamid.

"Right now," Moody tells *CW*, "we have only six producing plants overseas. I'd like to see about four more spring up in a couple of years." Where is Cyanamid likely to build? Moody says that Britain, Italy, Germany or Denmark, and Mexico are possibilities. "These are all good spots, with growing economies and what may be a good market for specialties."

Specialties Best Bet: For the immediate future, Moody sees no urgent call for heavy chemicals in these areas. But he indicated that new specialty products, now being researched or newly in production, might go well. He refers in particular to insecticides such as malathion, which was used in Florida on the Mediterranean fruit fly; Thimet, which is used to treat seedlings; various types of plastic specialties, and acrylonitrile derivatives.

"Actually, it could be several things," says Moody. "We don't yet know precisely what we're going to make. What we do make will depend on market studies that will get under way in a few weeks."

Moody expects that whatever is made overseas probably won't be shipped back to this country. The new division will concentrate on foreign markets, such as those within Europe's free-trade zone. "Eventually we may ship some back to the U.S. but, in any event, not very much."

No Switch on Tariffs: Moody, a past president of the Synthetic Organic Chemical Manufacturers Assn. and a leading advocate of protective tariffs for chemicals, said his new post doesn't signify any material change in his attitude toward chemical tariffs for the U.S. "The Defense Dept. and I still feel that the organic chemical industry is vital to defense." However, Moody concedes, the outlook is for a general swing in the direction of liberalized tariffs—perhaps not across the board, but nevertheless, "a definite trend toward lower tariffs—provided we don't get ourselves into a real depression."

But conversely, Moody foresees higher tariffs on goods coming into Europe. Says the new division chief: "It stands to reason those duties will go up. They'll have to, to protect the new common market."

In unifying its foreign operations, Cyanamid is rounding out a pattern outlined by such companies as Pfizer, Olin Mathieson, Schering and Union Carbide. And it seems likely that still more chemical firms will try for the growing profit potential overseas as a hedge against narrowing margins on their U.S. operations.

COMPANIES

Dixon Chemical & Research Inc. (Clifton, N.J.) will offer 165,652 shares of common stock to shareholders on the basis of one new share for each four held. Proceeds will go toward construction of a $640,000 aluminum sulfate plant. Principal underwriter is P. W. Brooks & Co.

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Fluorspar Corp. of America will offer 470,000 shares of common stock for sale to the public at $3 a share. The company, which has several fluorspar mineral claims in Nevada, will use proceeds for exploration and working capital.

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Champion Paper & Fiber Co. (Hamilton, O.) has acquired a half interest in NRC Vaculite Corp. (Cambridge, Mass.), producer of metalized film. Terms of the purchase (*CW, Jan. 4, p. 57*), believed to be a cash transaction, were not revealed.

•

Hydrocarbon Chemicals Inc. (Newark, N.J.), oil producing and pipeline concern, has acquired all the outstanding stock of Calunite Corp., West Coast fertilizer producer. Terms call for Calunite to be expanded and for its Pomona, Calif., plant to be operated as a wholly owned subsidiary of Hydrocarbon.

•

Bonneville Ltd. (Wendover, Utah), producer of potash by solar evaporation, has resumed payment of dividends. Distribution of 10¢/share is the first payment in 18 months, during which the company built a new "prilling" plant. The firm previously paid 35¢ annually.

•

Sandoz Inc. has acquired all the outstanding stock of Fine Colors Co. (Paterson, N.J.). Fine Colors will continue to operate unchanged as a wholly owned division of Sandoz. Terms of the transaction were not disclosed.

EXPANSION

Sulfur: Sulphur Exploration Co. (Houston) has signed an agreement with Freeport Sulphur Co. concerning continued exploration of Sulphur Exploration's claims on the Isthmus of Tehuantepec in Mexico. In return for a share of the profits in any new deposits, Sulphur Exploration's president, Irwin Kaplan, said his company will drill up to 26 wells during '58. In return, Freeport will erect a plant and handle all the marketing, provided commercial quantities of sulfur are available.

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Fertilizer: Dominion Fertilizers, Ltd. (Toronto), will start building a new superphosphate plant near Port Maitland, Ont., early in February. Completion is set for next summer. Output will go to both U.S. and Canadian users.

New Site: B. F. Goodrich Co. has purchased a 274-acre potential plant site near Augusta, Ga. Type of plant and cost were not disclosed.

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Lime: National Carbide Co. division of Air Reduction Co., will construct a $2-million lime-reclamation plant adjacent to its Calvert City, Ky., gas manufacturing unit. Similar to the lime-recovery facilities that are being planned for Airco's carbide plant in Louisville, Ky. (*CW, Dec. 21, '57, p. 22*), the new installation will recover calcium oxide waste from acetylene production.

•

Aluminum: Harvey Aluminum Co., is scheduled to start production at its $65-million aluminum plant in The Dalles, Ore. before mid-'58. The plant will turn out 270,000 tons of aluminum by June '63 under a General Services Administration contract.

FOREIGN

Chemicals/Germany: German chemical sales in '57 will total about $4.2 billion, a 13% jump over '56 sales, according to the Assn. of the German Chemical Industry. Since '50, German chemical prices have risen 7.5%, compared with an over-all industrial price boost of 24%. Chemical exports last year should top $1 billion, about 26% of sales. In '56, they accounted for 25%. Imports are also up, should reach $380 million—$60 million over the '56 total. Drugs showed the biggest increase.

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Salt/China: Communist China plans to import salt production equipment from Japan. Aim: to boost production from 7.6 million tons/year to 14 million tons for table salt and by-products such as caustic soda, calcium chloride, and bromine. The increased output is part of Red China's second five-year plan, would leave room for salt exports of some 2 million tons/year, mostly to Japan. Salt sales to Japan last year will total 1 million tons.

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Ammonium Sulfate/Japan: Japan has won a contract to export 50,000 tons of ammonium sulfate to India between Jan. and April '58. Price: $48/ton f.o.b.

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Synthetic Rubber, Polyethylene/Holland: Royal Dutch Shell's operating company, Bataafsche Petroleum Maatschappij, will build a butadiene-styrene plant with a minimum starting capacity of 50,000 tons/year at Pernis (near Rotterdam).

Netherlands State Mines has started construction of a 7,000-tons/year high-pressure polyethylene plant that will use the Imperial Chemical Industries process. When production starts in late '58, Holland will be the first Benelux nation to manufacture polyethylene on a large scale.

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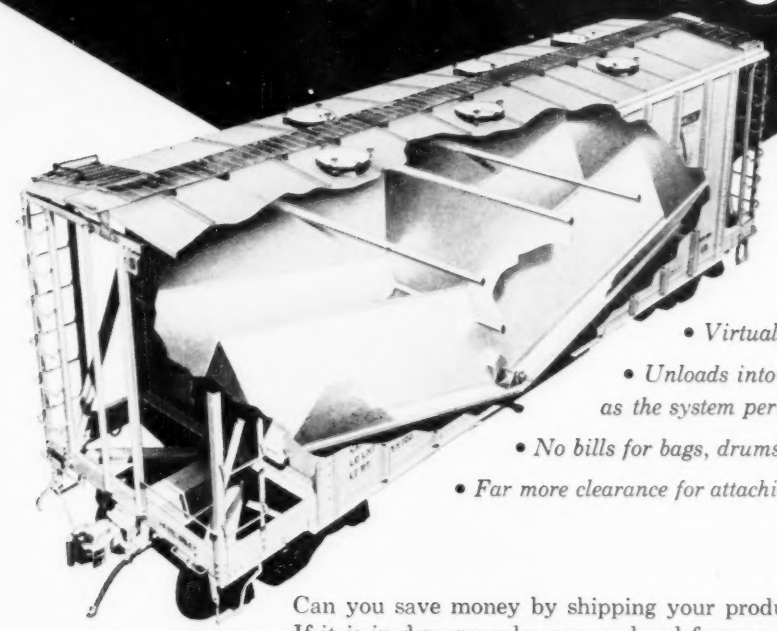

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Johns-Manville MICRO-CEL

A product of the Celite Division

Washington
Newsletter

CHEMICAL WEEK
January 11, 1958

Stepped-up military buying will bring new business to the chemical process industries. Pentagon spending and contract awards (which later becomes spending) are rising and will go higher in the fiscal year (1959) starting July 1, '58. Congress and the Administration will be backing bigger funds for missiles. Unless Congress provides an even heftier boost than expected, the more traditional weapons programs will be held to present levels or even cut back.

New contract awards have already started to move up. Latest estimates put this year's total for weapons and major equipment at nearly $15 billion—up $1 billion from prior forecasts. Most of this activity will come between now and July. Contract-letting was in the doldrums the past six months, creating a backlog of available authorized funds. These funds may be added to the new contracts coming from the current push behind missiles and research. Besides the weapons contract awards, the Pentagon will be putting some $1.7 billion into research and development, $2 billion into ordering spare parts, $2 billion for construction projects.

Lift to the economy. Military hard-goods spending was set at $12.2 billion for the current year (ending June 30, '58)—but it now looks as if the total will be well over $1 billion higher. For fiscal '59, military hard-goods spending will run at least $14.5 billion. At least $4 billion will be spent next year, compared with $2.5 billion this year, for missiles, particularly the long-range ballistic systems. At least $800 million will go into propulsion systems (chemical fuels, etc.).

These chemical markets stand to gain most from the heavier military buying: liquid rocket propellents—products such as liquid oxygen, alcohol, nitric acid, aniline, kerosene and helium; solid-fuel materials—ammonium nitrate, sodium nitrate, asphalt, ammonium perchlorate, potassium perchlorate, polysulfide, synthetic rubber, polyester resins, polyvinyl chloride, nitroglycerine and nitrocellulose; structural materials—ceramic-metal combinations, asbestos, glass-fiber-reinforced plastics and glass-reinforced polyester laminates.

Centralized control of military procurement of chemicals—probably including everything but the more specialized requirements of the missiles program—looks like a good bet, although a decision may not come along for awhile.

The proposal, which would give the Army's Chemical Corps the job of buying chemicals for all three services, was one of several "centralized procurement" schemes on the desk of Pentagon higher-ups when the Sputniks came along to sidetrack such less-urgent matters. But they're certain to get renewed attention once Congress steps up the pressure to streamline the Pentagon's management and procedures.

Washington
Newsletter

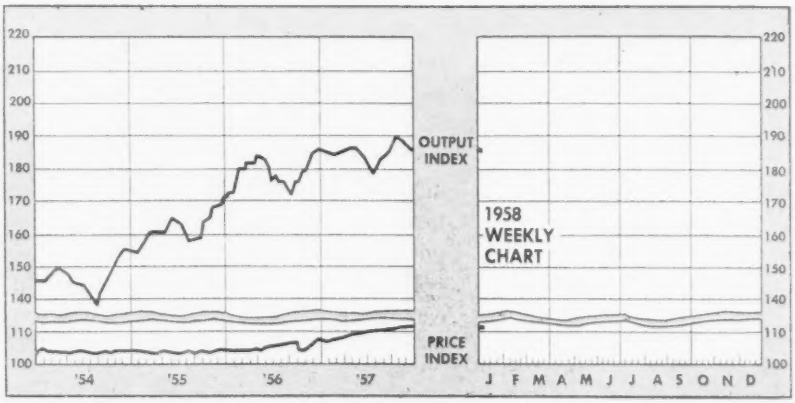
(Continued)

The Pentagon is weighing the "single manager" idea for other than weapons development. Defense Secretary McElroy is creating the "advanced projects research agency" to control development of new projects outside the traditional realm of the three military services. That includes such projects as the ballistic missile defense system (the antimissile missile), reconnaissance satellites, space vehicles and platforms.

The military services don't like it; the new agency will be responsible directly to McElroy, will have its own budget, will deal directly with development contractors and direct research efforts of the Army, Navy and Air Force. The agency will turn over new-weapon projects to the service assigned operational control after the equipment has been fully developed and tested.

•

Declassification of stockpile procurement data may get serious backing from the independent stockpile advisory committee set up by Defense Mobilizer Gordon Gray a few months ago. The committee, meeting in Washington this week (Jan. 9-10) to hammer out a flock of policy recommendations, reportedly is ready to urge an end to the official secrecy that has long shrouded figures on the amounts of various strategic materials held in the government reserve. Committee members feel that traders can and do make fairly shrewd estimates of the totals from published sources—and the secrecy breeds misunderstanding and fear of U.S. stockpile policy among foreign producers, particularly in periods of sharp price fluctuations.



Business Indicators

WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	184.0	186.0	183.0
Chemical Week wholesale price index (1947=100)	111.2	111.1	106.9
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	39.60	39.28	44.75
MONTHLY **Employment (thousands)**	**Latest Month**	**Preceding Month**	**Year Ago**
All manufacturing	16,555	16,787	17,072
Chemicals and allied products	826.6	833.7	832.6
Nondurable goods	6,986	7,096	7,053

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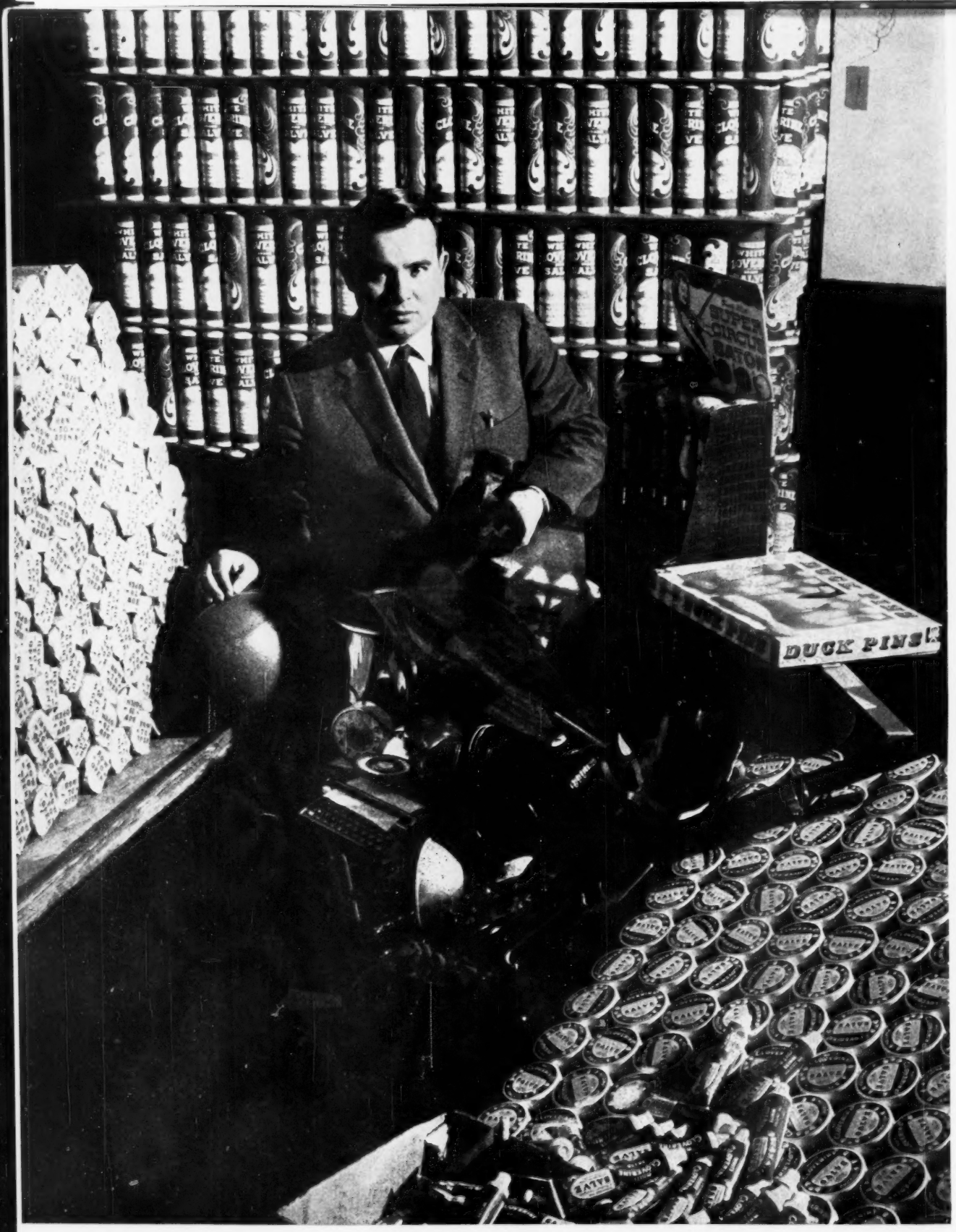

George Wilson with some of the premiums that boost Cloverine salve sales to $1-million a year.

CW PHOTOS—CLYDE HARE

Wilson—26-year-old president—directs his specialty-making from his plant on Cloverine Terrace.

During the peak season, 125 employees make and pack Wilson's salve, other chemical specialties.

Young Tycoon Tops $1 Million/year in Salve

About 2 million U. S. children will this month receive business communiques from George Wilson Chemical Co. (Tyrone, Pa.). This specialties company, which averages yearly sales of better than $1 million, does virtually all its business through salesmen between the ages of 8 and 14. And in writing the kids, it's continuing a practice that has proved profitable for 62 years.

Best known for its White Cloverine-brand salve, George Wilson Chemical is a prize example of how a specialties maker can defy most of the accepted canons of business and still succeed. Its method of doing business, its managerial setup, its belief in the integrity of the individual salesman and its employment practices would set most management consultants muttering to themselves.

Top management at the George Wilson Chemical Co., for instance, includes a 26-year-old president and a 92-year-old vice-president. George C. Wilson III is the young chief executive; he took over that position when his father died in '51. And Mrs. George C. Wilson, Sr., George's grandmother and widow of the com-

The plant's postal substation and presses keep salve flowing to 300,000 pint-size salesmen.

pany's founder, is the company's senior vice-president.

The company turns out a variety of products ranging from toothpaste and gelatin products to salve and face powder, but the bread-and-butter item, accounting for well over 60% of gross sales, is the salve. Although it can be obtained in most U.S. drugstores, the kids who peddle it door-to-door make up the bulk of sales. About 60% of the salesmen are children, 35% women, 5% men.

Pint-Size Salesmen: Behind Wilson's success in recruiting salesmen is its premium program. For selling 14 tins of Cloverine salve (ingredients: rectified oil turpentine, white petrolatum, white refined wax), the agent may either select a premium from a 16-page premium book or keep $1.25 of the $4.90 collected from customers.

Few of the 300,000 children currently selling the products, however, keep the money. Instead they pick such items as pencil cases, fishing outfits, roller skates, heating pads, bicycles and live ponies. Their favorite premium now is an archery set (for selling one order of salve). About 10,000 children chose that item in '57. A surprisingly popular premium over the years has been the Bible—last year, 3,000 children selected it as the premium.

About one-third of the agents, reports Wilson, go after repeat business. For the really serious salesman, there's a sales kit that includes six packages of salve, seven packs of cough drops, two of aspirin and two of laxatives.

Comic Come-On: Most of the company's initial contact with its agents is obtained through advertisements

'Collecting isn't hard,' says Wilson. And Mrs. Wilson—92-year-old vice-president—agrees.

Can Baker AMMONIUM THIOCYANATE

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Baker Ammonium Thiocyanate, Technical, Crystal or 50% Solution, is a versatile chemical employed by many industries to help solve vexing problems of corrosion, synthesis and purification.

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Ammonium thiocyanate is used extensively as a corrosion inhibitor for steel tanks and equipment employed for the storage and transportation of ammoniating liquors. Recent studies confirm that Baker Ammonium Thiocyanate at concentrations greater than 0.1% by weight, *reduces* the corrosion rate of ammoniating liquors at 30°C. (86°F.) to about 0.02% of the uninhibited rate.

VERSATILE in SYNTHESIS as an INTERMEDIATE

1. *The Thiocyanate group* can be introduced into many organic compounds by reaction of ammonium thiocyanate with the corresponding halide.
2. *Thiocyanogen* can be generated by the electrolysis of an aqueous solution of ammonium thiocyanate.
3. *Aromatic thiocyanates* can be prepared with ammonium thiocyanate with the aid of chloramides.
4. Some amine salts react with ammonium thiocyanate to give the corresponding *amine thiocyanates;* some yield the corresponding *thioureas.*
5. Ammonium thiocyanate can be reacted with: Dicyanadiamide to yield *guanidine thiocyanate;* Nitrites to yield *amidines;* Acyl derivatives of a-amino acids to yield *2-thiohydantoins.*

EFFECTIVE in ZIRCONIUM PURIFICATIONS

Ammonium thiocyanate is employed in a purification of zirconium. Zirconium and hafnium thiocyanate complexes are selectively extracted.

Because Baker controls all the raw materials that go into Baker Ammonium Thiocyanate, you are always assured of uniform quality and scheduled availability.

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Baker Ammonium Thiocyanate, Technical, is available in crystalline form by the truckload and carload in 200, 100 and 25-pound fibre drums, with polyethylene-liners. The 50% Solution is shipped in 8,000-gallon specially lined tank cars.

BULLETINS AVAILABLE

Baker Product Data Bulletins on ammonium thiocyanate provide valuable information about its many industrial applications. Bulletin 102 is a research report on ammonium thiocyanate as a corrosion inhibitor for nitrogen solutions. Bulletin 101 gives data on general properties and uses. We will be happy to send you either or both bulletins as well as price information.

PURITY BY THE TON — *for production use*

J.T.Baker CHEMICAL

J. T. Baker Chemical Co.
Phillipsburg, New Jersey

Wilson's empire isn't salve alone. He's also head of a chain of nine movie theatres in Pennsylvania.

in comic books and newspaper comic supplements.

Collecting the money for salve that's sold isn't the problem it might seem. Wilson says that over 80% of the salesmen turn in the money they collect—without urging and usually within a month after they receive the goods. Some are not so prompt. The company has occasionally received payment for goods sold 20 to 30 years ago; some of the payments include interest. (The company has had help from Billy Graham. His urging people to recollect the sins of their youth and try to correct them has prompted many people to pay up for unsold salve that had been weighing heavily on their consciences.)

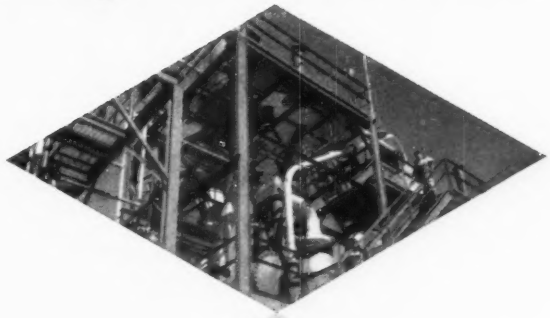
For agents who don't send in either the goods or the money for it, the company's usual course is to send out a reminder 45 days after the products are shipped, then repeats every 30 days, until six letters have been sent. Then, if still unsuccessful, the company sends out its big convincer under the letterhead—"Missing Persons, Inc." The letter's signed by N. S. Miles, Detective Division.

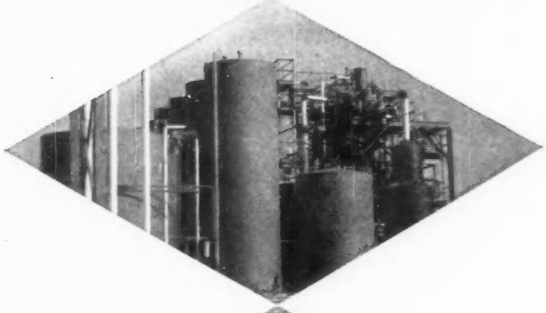
Where It's Made: Wilson products are manufactured at a 300,000-sq. ft. plant consisting of two large buildings. The area is called Cloverine Terrace.

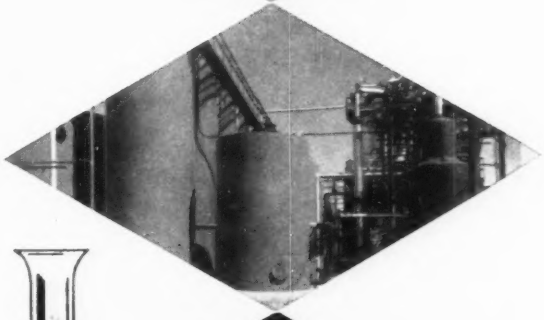
During the peak season, about 125 people are employed at the plant. Most of them are veterans of many

Community and family activities round out the bustling daily schedule for the youthful executive.

Stepan Methyl Esters







The new Stepan plant at Millsdale, Illinois (near Joliet), includes a high capacity methyl esters production unit. This unit, of the very latest design, is now producing a wide range of methyl esters from coconut oil of high purity and excellent uniformity. These products, as intermediates, offer you interesting possibilities for improving your product or products.

SUGGESTED USES

Intermediates in the manufacture of:

Detergents	**Resins**
Emulsifiers	**Lubricants**
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Unsaponifiable content	1.5% max.	2.0% max.
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M-32

SPECIALTIES

years with the company; over one-third are members of the 25-year club.

Tycoon: Running this sizable operation has turned George C. Wilson III into an adroit and aggressive businessman. Besides being president of Wilson Chemical, he is also head of a chain of nine movie theatres and an officer in a build-and-lease operation called Wilson Associates. He's the youngest member of the Young Presidents Organization and is on three boards of directors (Community Chest, Chamber of Commerce, and Tyrone Recreation Assn.). He is also a vestryman of his church. He is married and has three boys, hopes they will succeed him in the business.

Meanwhile, Wilson is having a field day with a type of chemical specialty that most businessmen would regard as futureless. With an unusual company, and an unusual sales technique, he's had unusual success.

PRODUCTS

Antidust Agent: The Dutch firm Scholten's Chemical Works (northeastern Netherlands) has developed a compound that prevents dusty soils from being blown away by winds. The new product, for which a patent application is pending, is said to "fix" soil for two weeks to two months. It's a cold-water-soluble starch derivative. 2-4% solution of which may be sprayed over the field by means of conventional insecticide spraying machines. Suggested dosage: 110-220 lbs./2.5 acres.

•

Fluffier Fabrics: Makers of fabric conditioners will gain a strong competitor this year when Du Pont enters the field with its new liquid product, Zelcon. Biggest advantage of Zelcon, claims Du Pont, is its ability to make all types of fibers soak up water more readily. "Unlike many fabric conditioners now marketed, Zelcon does not impart a water repellency to fabrics," says the company. It won't retail the product, but will sell to marketers and compounders for formulation into their own products. It's now available in Sunlight Downy-Dry Fabric Softener made by Sunlight Chemical Corp. (Phillipsdale, R. I.).

•

Moth-Killer: Geigy Chemical's Mitin Durable Mothproofing is the first chemical process to receive McCall's use-tested tag.

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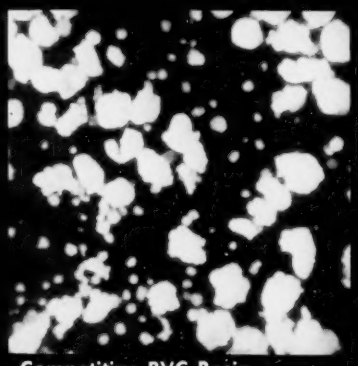

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Increased use of industrial engineering specialists means increased profits, says FMC's Reul.

'Time for a Fresh Approach to Cost-Cutting'

Increased profits with no increase in sales and little or no capital outlay. That's the attractive proposition that a big segment of the chemical industry is overlooking at a time in its history when it can least afford to do so. So said Ray Reul, coordinator of industrial engineering for Food Machinery and Chemical Corp.'s chemical divisions, in talks with *CW* last week.

Reul's suggested route to increased profits: more use of the industrial engineer—a specialist in the most efficient use of manpower and facilities. One segment of the chemical industry, he says, isn't using such experts at all, and another is trying a "do-it-yourself" approach (i.e., industrial engineering without industrial engineers). This, in the face of a year-and-a-half-long profit squeeze that may well continue through '58 (*CW, Dec. 28, '57, p. 75*).

Own Worst Enemies: Reul, who is a chemical engineer as well as an industrial engineer, has a foot in each field. He sums up the reluctance to hire industrial engineers in a sentence: "Some chemical firms tend to be their own worst enemies."

The chemical industry he explains, has achieved spectacular success through chemical technology. This has led to the practice of what he terms "inbreeding"—the hiring of only chemists and chemical engineers for line positions, on the grounds that a chemical background is essential.

"Such individuals seldom have experience in any other industry and the opportunity for cross fertilization with ideas from other industries is almost

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nonexistent. For this reason, the chemical industry has been excessively slow to recognize and adopt the innovations of many other industries. Result: some among chemical management know very little about industrial engineering, and many don't realize what industrial engineering can do for them," Reul says.

Time-Study Stereotype: The old idea of an industrial engineer, stop watch in hand, hovering over an employee, often prevails. Many CPI plant managers say this isn't for them—chemical processes just aren't suited to it.

Reul agrees that in most chemical plants there is little of the easily measured repetitive cycles that are often common in the mechanical industries. But the stop-watch technique is only one of many tools available. Industrial engineering's purpose is to find, measure, collect and analyze facts about the performance of work by people and machines. And industrial engineers in some chemical firms are pioneering the adaptation of various techniques to chemical industry.

More Interest: Reul rates these pioneering efforts as important factors in the chemical industry's growing interest in industrial engineering. But three other factors—rising labor costs, increasing cost of new plants, and the profit squeeze—have perhaps done as much to increase the acceptance of the efficiency-oriented industrial engineer. Reul feels that many chemical firms will soon be forced to consider this utilization of manpower and facilities as important as the old, familiar ones of yields, raw materials, and markets.

The rapid postwar rise in direct labor costs has been so great that plant managers can no longer ignore it. And direct labor costs as low as 10% of the operating cost can be deceiving because of associated indirect labor and fringe benefits.

Another example: rising cost of new plants because of higher construction costs and greater process complexity. Maximum productivity is necessary to put and maintain these plants on a paying basis.

While these factors are helping boost the industrial engineer's acceptance in the chemical industry, it is still far below the average for other industries. A recent *Factory Management and Maintenance* survey showed that of 35 chemical, rubber and pe-

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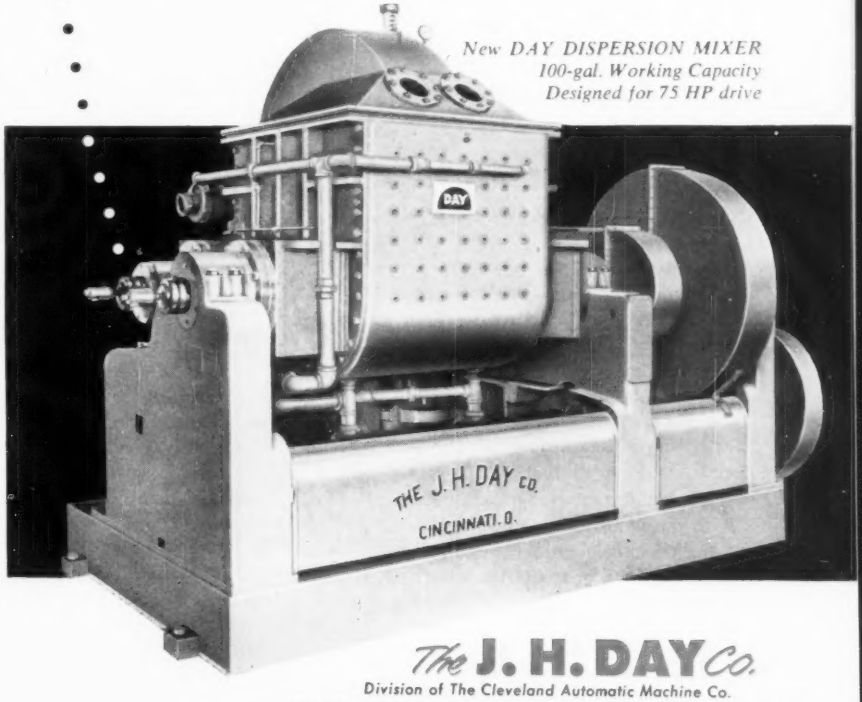

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troleum plants, more than 50% had no industrial engineering functions, compared with 27% of the 191 plants in other industries (*CW, Oct. 26, '57, p. 49*).

No-Do-It-All: Some of the firms have taken a step in the direction of including industrial engineering as a plant management tool, but often they remain reluctant to employ industrial engineers as such. "They feel that the line or staff supervisor can do the job," says Reul. "But the supervisor faces several problems in trying to handle the extra job."

First, he probably isn't schooled in industrial engineering know-how. He must take time—at the expense of supervision—to learn; then he must take the time to do the work. But his inexperience frequently leads to a combination of unsatisfactory industrial engineering and supervision, Reul says.

And if the supervisor takes on an assistant or if the area of his supervision is narrowed to cut his workload, the ratio of line supervision to labor—already highest in industry, according to the *Factory* survey—is further increased.

Second—and perhaps equally important—is the difficulty a supervisor has in analyzing his own operations objectively.

Reul's Analysis: In applying industrial engineering, you have a choice of teaching chemical engineering to an industrial engineer or teaching industrial engineering to a chemical engineer. And you are probably better off teaching chemistry to the industrial engineer, although the alternate plan may work.

Some areas where industrial engineering may be profitably applied:

- Facility requirements—Are new facilities really essential? What changes, additions will pay off?
- Force accounts—What is actual job content (e.g., physical work, attention time) of work? What changes in work distribution, methods, facilities will minimize forces needed?
- Paper work—What paper work really serves the purpose in planning, scheduling, control, etc.?

"The important thing," says Reul, "is to try industrial engineering. Part of the chemical industry is profitably doing so now. The rest of the industry, can improve its profit picture by following this lead."

EQUIPMENT

Computer: Magnetic Instruments Co. (Thornwood, N.Y.) is out with its new Model 0557-1 computer, designed specifically for measuring slowly varying, low-level voltage changes of dc. signals. Range: voltage changes from 10 to 5,000 microvolts/second, superimposed on static voltages from 0 to 100 millivolts. Unit is 7 in. high, mounts in standard 19-in. relay rack, is suitable for operating any standard recording potentiometer. Input power: 115v., 60 cps. Typical applications include measurement of temperature changes as small as 0.5 F/second; slow pressure changes measured from strain gauge pressure transducers; neutron flux change in nuclear reactors.

•

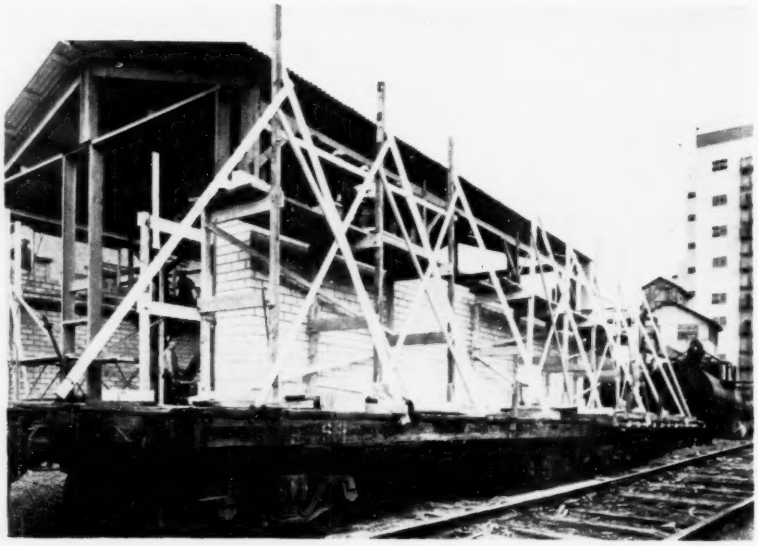
Fine-Mesh Screen: For fine screening applications, Pyramid Screen Corp. (Brookline, Mass.) says it now has available a screen with holes 10 times smaller in diameter than the average human hair. The conical-shaped holes are 9 microns in diameter; screen area has 250,000 holes/sq. in. The screen materials offered: pure nickel, pure copper, other base metals. Chrome-plated screens are available for abrasion-resistance service.

•

Bypass Valve: Watts Regulator Co. (Lawrence, Mass.) is out with a new, moderately priced, all bronze, high-capacity automatic bypass valve. The valve is set to open at 10-250 psi., returns excess liquid to source. Sizes: ¾ and 1 in. The ¾-in. size, set for 100 psi. will bypass 42 gpm. of liquid.

•

Metering Pump: Milton Roy Co. (Philadelphia) designed its new line of controlled-volume diaphragm pumps for metering toxic, corrosive and costly chemicals to be interchangeable with its standard line. Big difference



Working on the Railroad

Masons worked by railroad timetable in laying up this tile wall of a new station for loading tank cars with caustic soda at Allied's Solvay Process Division plant at Syracuse, N. Y. Reason: their scaffolding was erected on two flat cars that were moved twice a day to permit the loading of tank cars at the old facilities on the same siding.

The trick, recently revealed by Solvay, helped the firm out of a spot when it was forced to build in cramped quarters to keep from hampering production and shipment of caustic soda. The solution, devised by Joseph Sebesta, maintenance field foreman, worked smoothly—caustic loading was uninterrupted and there was little delay in the construction project.

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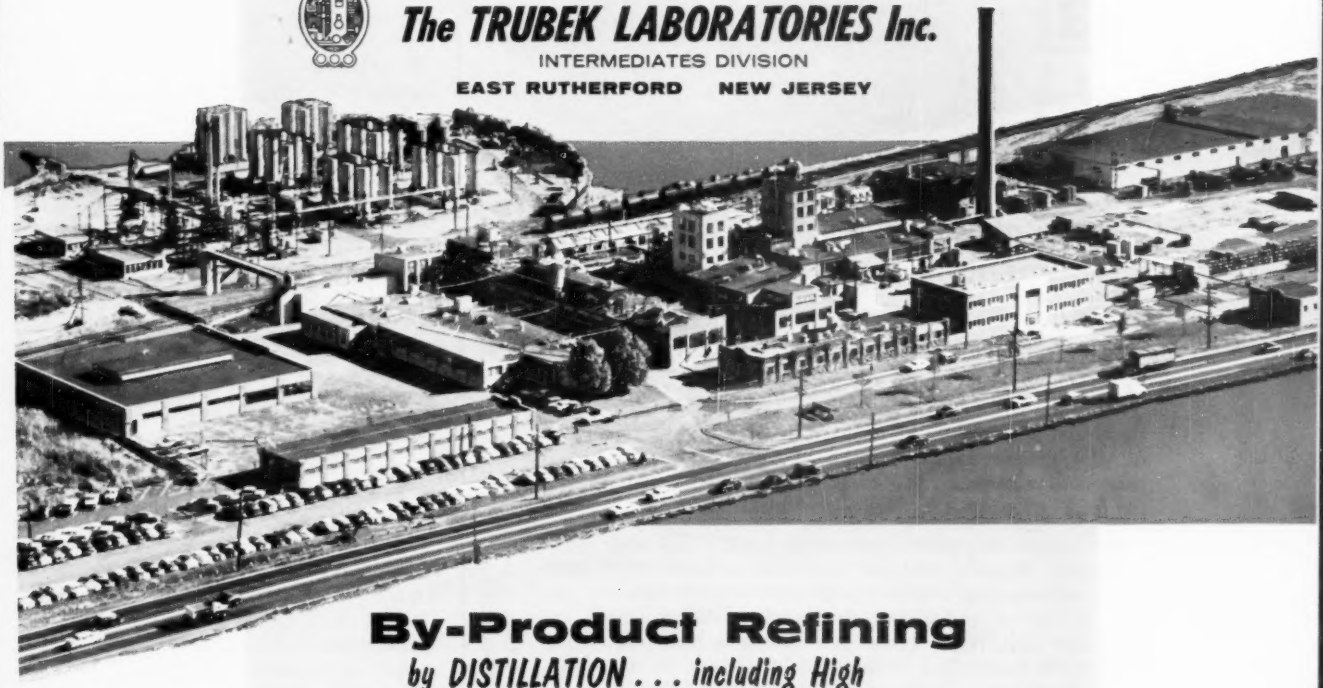

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is the switch to Teflon diaphragms for sealing the liquid ends from plunger and housing. Pump operation: plunger displaces hydraulic fluid, which strokes the diaphragm to impart pumping action through double-ball checks. Pumps have maximum capacities from 1.1 to 138 gal./hour, pressures to 2,000 psi., manual or automatic capacity adjustments from 1 to 100%. Accuracy: ±1%.

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Radioactivity Monitor: Nuclear Measurements Corp.'s (Indianapolis) new Model AM-33 air monitor simultaneously measures alpha and beta-gamma activity of airborne particulates. The firm says interpretation and evaluation of readings are not required. Integrated unit has detector, amplifier, discriminator, anticoincident circuit, counting ratemeter, high-and low-voltage power supply, alarm system and continuous recorder. Automatic, continuous operation is possible for periods up to one month. Monitor may be used as a mobile unit, is 7 ft. high, 24 in. wide and 25 in. deep, weighs 600 lbs.

•

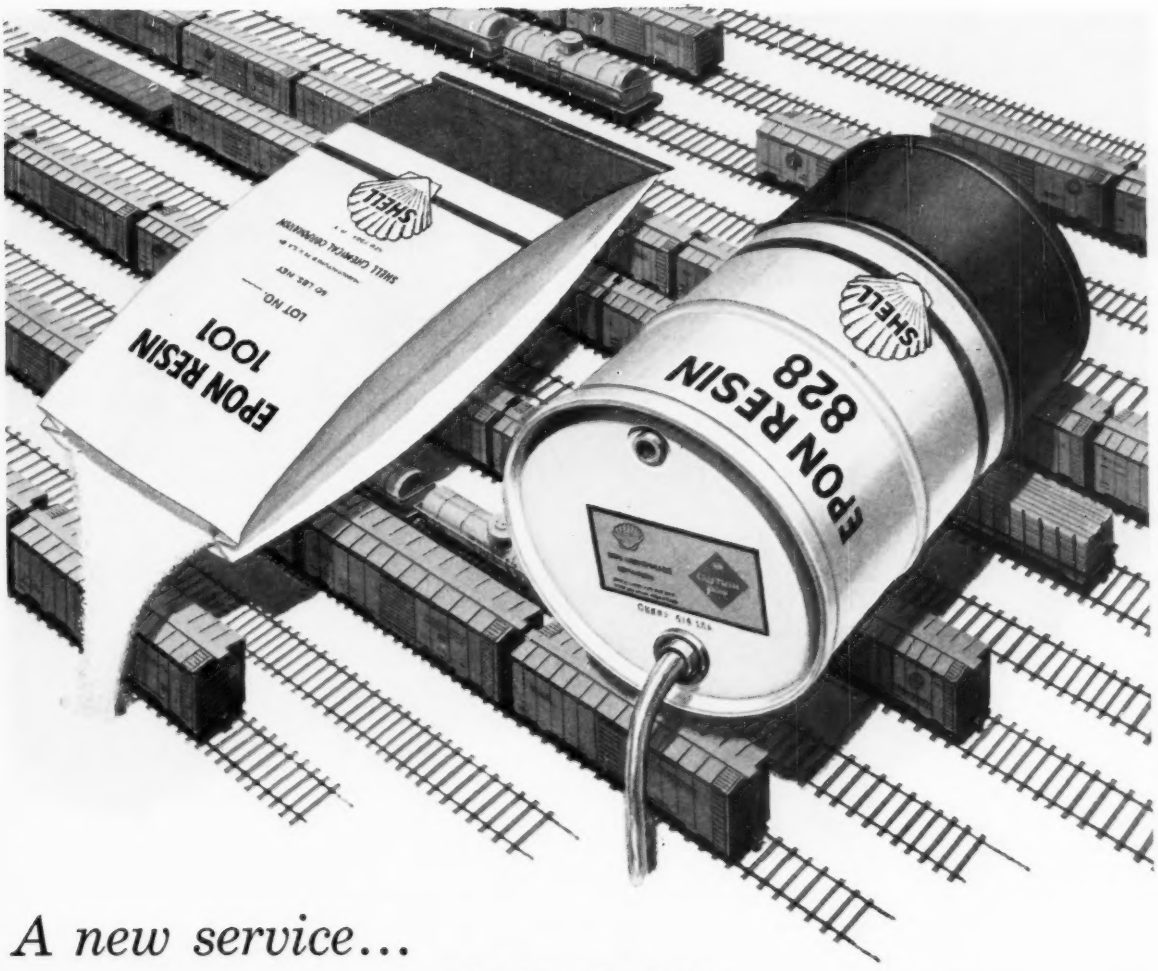
Tin-Lined Tubing: Myron L Co. (Monterey Park, Calif.) is offering annealed copper and other metal tubing with an impervious, pure-fused tin lining bonded by the firm's new process, which is said to provide an inseparable bond. Tubing may be flared, cut, bent, flattened, soldered or continuously heated to over 300 F without destroying the protective lining. The lining is ductile, does not alter the properties of the copper tubing. It will withstand sharp 180-degree back bend without cracking.

•

Drain Valve: Designed originally for aircraft use, Clary Dynamics' (Sam Gabriel, Calif.) line of double-seal drain valves is now available for industrial applications. The valves eliminate the need for draining a container or feed line to repair a valve leak, have a secondary seal that permits the primary poppet to be replaced without loss of fluid.

•

Silicone - Insulated Transformer, Westinghouse Electric Corp.'s (Pittsburgh) new 8.7 kv. current transformer has silicone-base insulation for resistance to moisture, temperature change and abrasion. Called Type SM-8.7, it replaces Type CT-8.7.



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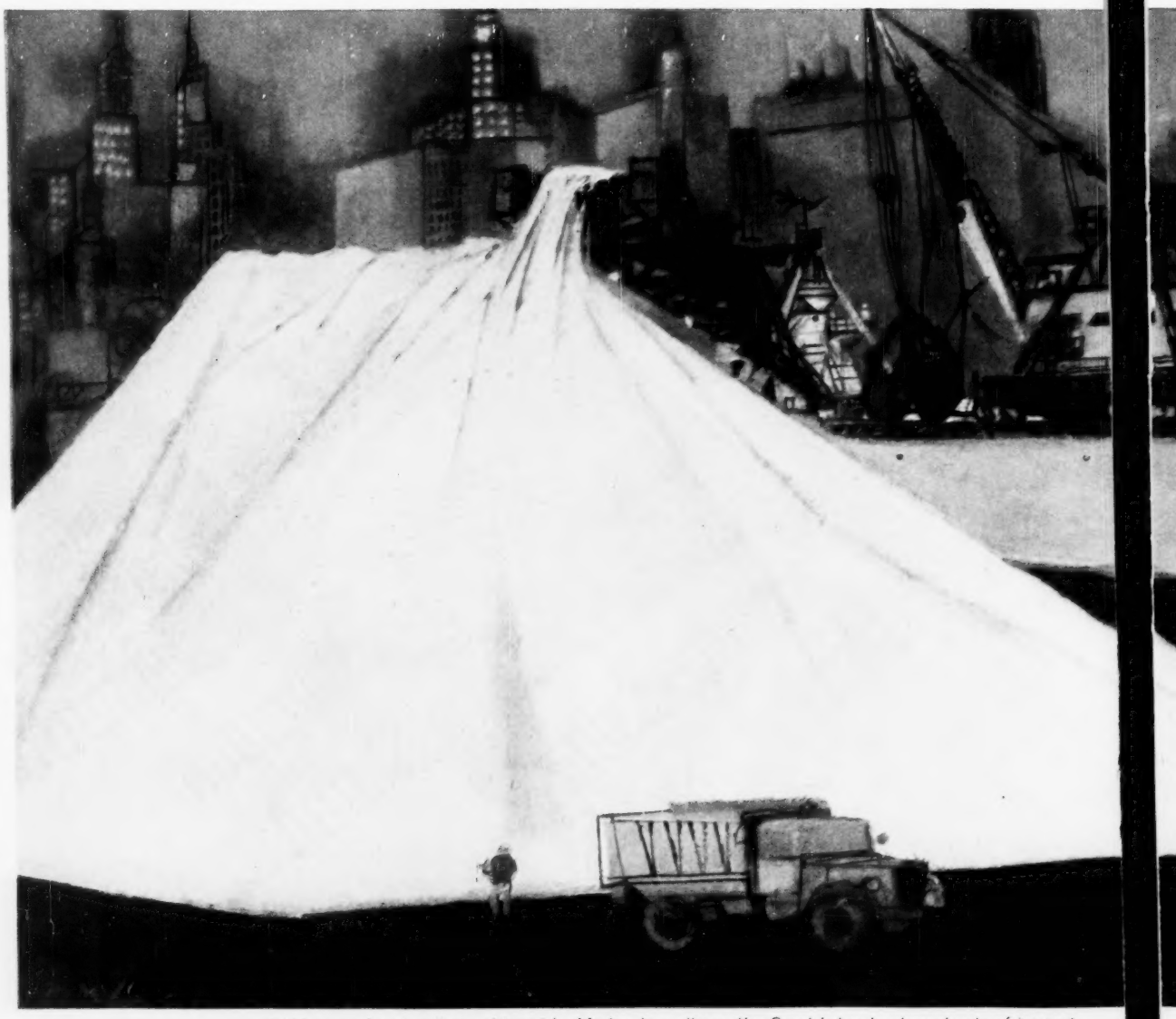

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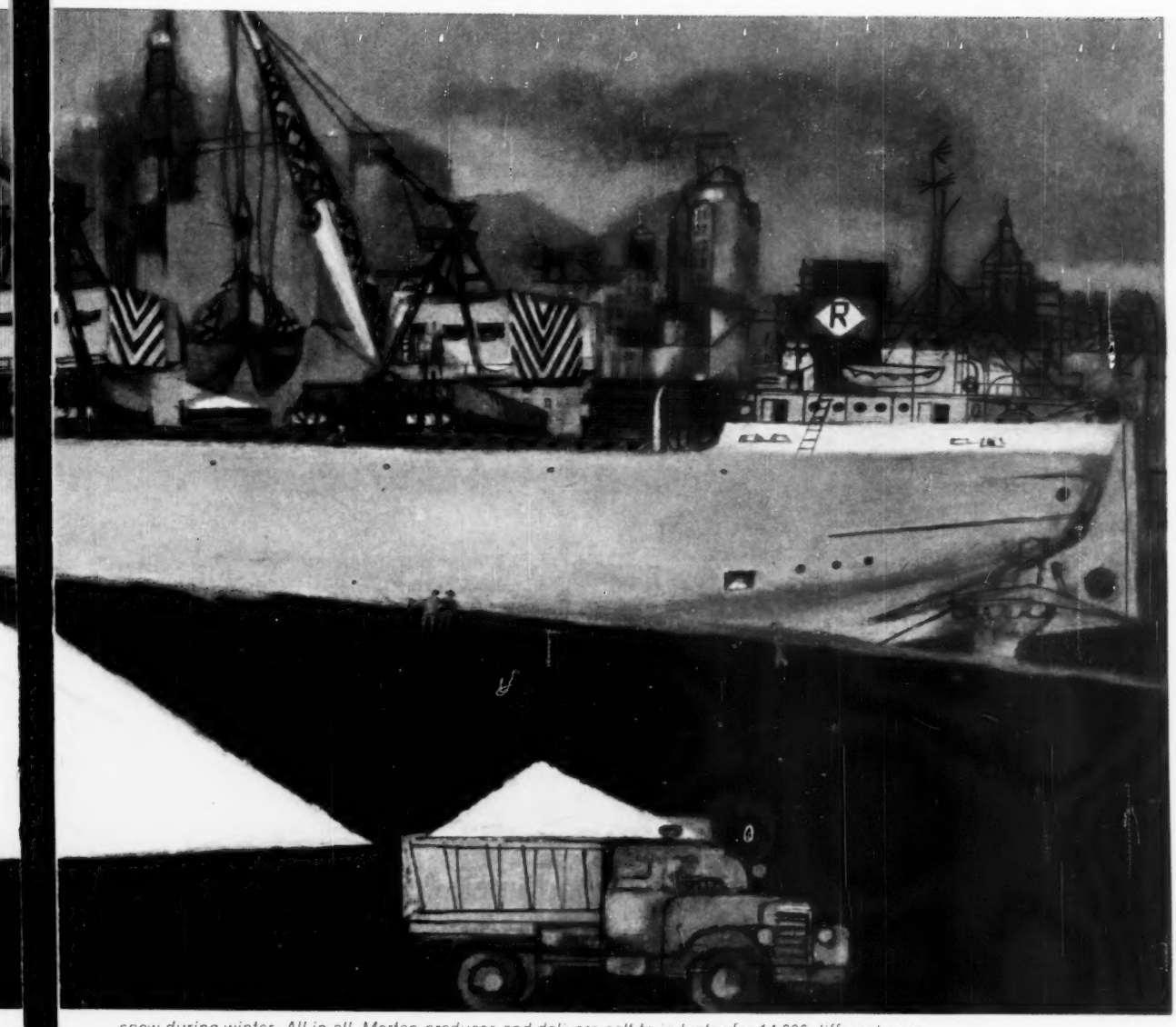

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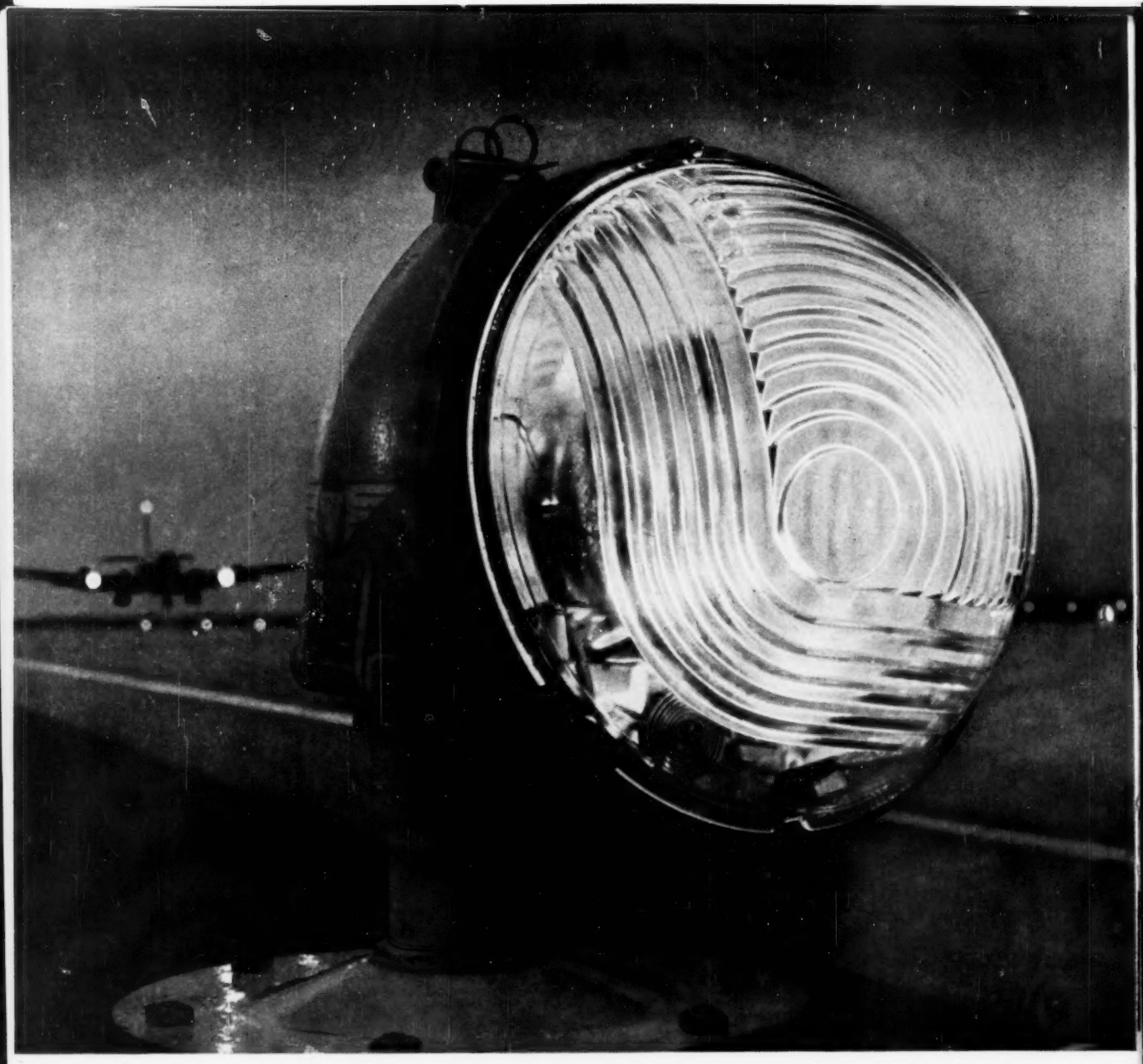

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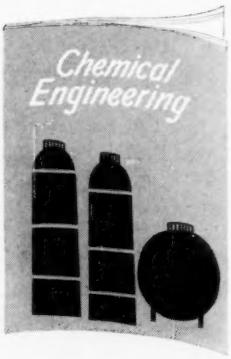

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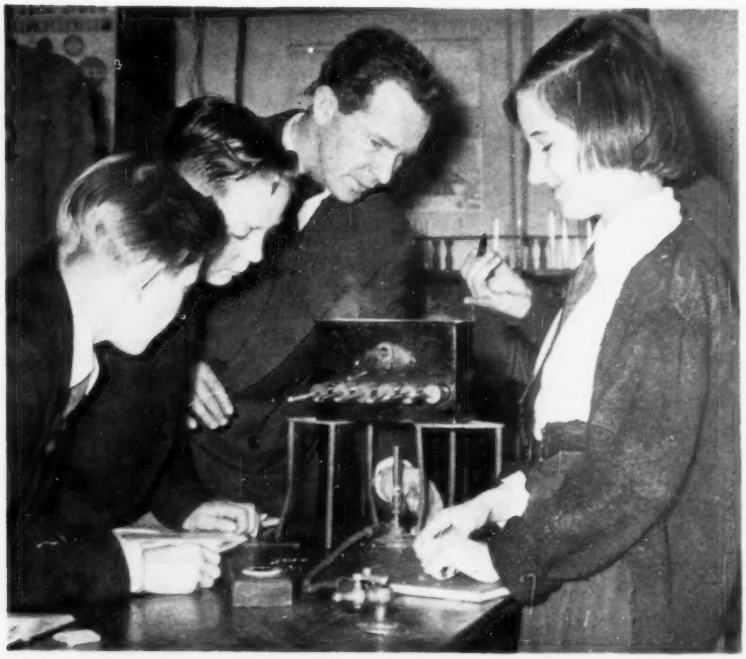

British girls are encouraged to prepare for technical careers.

Britain Bets on 'Girlpower'

Along with news last week that President Eisenhower will ask Congress to vote more than $50 million to improve science teaching comes encouraging word on British technical education.

Britain's government-sanctioned experiment to provide more scientists, engineers and technicians is meeting with success, may serve as a model for science-education schemes in the U.S.

The experiment is a program to promote the technical education of girls between the ages of 13 and 15. It was begun in a London-suburb school in the fall of '56, and is now pretty much accepted as part of the curriculum. The program actually stems from these basic educational and national needs:

- To halt what officials consider a tendency on the part of girls' schools throughout Britain to concentrate on biology rather than on physics and chemistry.
- To concentrate on sound training in general science in at least two years of secondary schooling of both boys and girls. (British secondary schools correspond to U.S. high schools.)
- To have all students in secondary "modern" schools follow a course in general science through the fourth year. "Modern" schools are those that offer a general education; the graduating age is about 16.
- To encourage both male and female students to attend extension classes at technical colleges after leaving secondary school.
- To provide British industry and other users of scientific manpower with at least 165,000 qualified scientists and engineers by '59 (an increase of 30,000 over the '56 level), and at least 220,000 by '66. Surveys show that in the next few years, chemists will be the most eagerly sought among scientifically trained personnel.

Teacher Shortage: The foremost obstacle to broadening the base of British technical education to include more secondary school girls is the shortage of technically trained teachers in all-girl schools. Another real problem is that an English girl's average career in business or industry is only five years. Consequently, many parents are reluctant to urge their daughters to consider the long training required to become a qualified scientist or engineer.

Limited Facilities: In the past, girls have not been excluded from technical training. But the necessary facilities have been, and are still, to a large extent, inadequate or lacking in most of the schools throughout Great Britain.

One of the few exceptions is the Davidson Secondary Modern School at Croydon, a London suburb. It was here that the experiment was undertaken to get more girls into scientific courses.

The girls, working alongside boys (*see photo*), displayed such keen interest in technical subjects that successful outcome of the experiment was assured almost from the start.

Official Concern: Sir David Eccles, former Minister of Education, has repeatedly referred to the wide disparity between the number of boys and girls in Britain who continue their education after leaving secondary schools. "For every 16 boys who take full-time university courses in technical colleges, only one girl does the same," he has said.

He points out that if Britain is to have the scientists and engineers it needs, more females will have to join the technically trained force. This means more females will have to take technical college training.

Last year, the annual gross outflow from British technical colleges and universities of graduates with bachelor degrees in the basic and applied sciences was something over 10,000. Half were scientists, half engineers.

Officials expect the number to reach 12,000 for the 1958-59 year. The average annual yield for the following five years will have to reach 16,000, however, if the force of scientists and engineers is to increase to 220,000 by '66.

A bright spot in the task facing British educators is the favorable trend in the number of students staying in school. The present proportion of each age group remaining until the pre-university year (between the ages of 16 and 18) is about 10%. Trends indicate that the proportion will be about 15% by '67.

How to Improve Morale of Technical Employees

Salaries—Give employees better explanation of pay rate structures.

Tie salary increases, in part, to merit of work.

Assignments—Assign tasks with greater challenge, particularly to individual workers.

Provide opportunity to carry research and design jobs into actual operation.

Ask less report-writing on routine matters and on "dead-end" assignments.

Social—Increase their contacts with people in other functions.

Treatment—Minimize routine.

Let technical people see ideas in operation.

Allow chance to do creative work.

Recognize engineers and scientists as professionals.

Give technical people more support.

Minimize regimentation.

Credit individuals who do the job.

Play down "team" effort.

Help individuals adjust to company ways of doing things.

Technical People Seek Independence

Management must recognize its engineering and scientific personnel as different in personality and job outlook from other types of workers. That's the gist of a candid new University of Michigan survey, available this week. Interviewed were some 400 scientists and engineers, many of them in chemical process firms.

Aim of the survey was to get the views of both supervisory and nonsupervisory people about their job outlook, goals, satisfactions and dissatisfactions with working in their various organizations. Ten companies cooperated. Findings were supplemented by interviews.

Lesson: In essence, the study indicates that scientists and engineers seek personal recognition, enjoy the challenge of a difficult task, desire freedom to exercise their own initiative, and consider themselves as more individualistic than other employees. Some might argue, of course, that such an outlook is shared by a far greater segment of the industrial population than engineers and scientists alone. Nevertheless, the survey results do show some important ways (*see table*) in which management can improve its approach to technical employees. Consideration of the factors is becoming increasingly important—and more complicated—as government, industry and public become more concerned with the stature of technical people.

Indeed, comments made in the interviews emphasize this. The 83% who felt they were "different from other employees" concluded that the difference is more in degree than kind, that it lies in basic ideals and attitudes toward their jobs. Many felt they were more willing to assume responsibility for a problem, but that "they need freedom in their work to do a good job."

A Questioning Attitude: Apparently, scientists and engineers take a skeptical attitude toward many management practices affecting their work. Though they see the need for newcomers to learn how the company operates, they don't accept management policy without question. One area of conflict, and not necessarily a new one, is that of salary. The men surveyed felt generally that their salaries shouldn't be based simply upon those paid for similar work elsewhere, but should take cognizance of growing lag between pay in technical fields and that in other professional fields.

Moreover, the interviewees seem to think that management seeks commercial results from its people too quickly and demands too much conformance with the company's methods.

Supervisors: The surveyors asked technical people what they consider the qualifications of so-called "outstanding persons." Above all, the respondents in supervisory positions felt such a person should be technically competent, have a thorough knowledge of his field. Second, they said, such a person should be congenial.

Nonsupervisory people, on the other hand, when asked about the qualities necessary to be a success in the company, had a different view. They overwhelmingly thought congeniality was of prime importance, but felt it should be coupled with aggressiveness and ambition.

Boiled down, the survey shows scientists and engineers are chafing at the bit. But most of those in the 10 companies reflected that they were "fairly well satisfied" with their present jobs. For management, the survey indicates there's still much room for improving working conditions, particularly along lines to promote individual recognition, reward initiative and give technical people a broader chance to break from routine.

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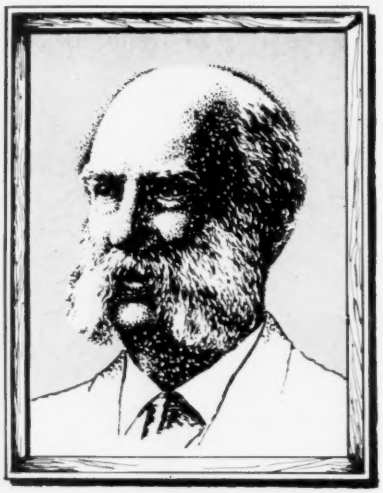
Excerpts From The Chemical Hall of FAME

James Mason Crafts

(1839-1917)



In 1911 Crafts was awarded the Rumford medal by the American Academy of Arts and Sciences for his investigations into thermometry that were so accurate they are still regarded as classic.

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ADMINISTRATION

WIDE WORLD

Judge Rodney: Nothing new in fertilizers made from feathers.

LEGAL

Fertilizers from Feathers: A U.S. district court judge in Wilmington, Del., has ruled invalid a process patent for turning feathers into fertilizers and animal food because, according to the judge, it contained nothing new.

The patent (No. 2,702,245) was issued in 1955 to B-M-K Corp. (Salisbury, Md.) and was contested by 28 companies in 15 states.

According to Federal Judge Richard Rodney, an 1874 British patent covered the same process, in general, and also included a glue. He noted: "An invention must be capable of accurate definition, and this accurate definition must be set out in such a way as to establish newness of the invention."

•

'Diurial' Trademark Case: Louis Cohen, doing business as Delco Chemical Co., has filed suit against Merck & Co. in U.S. district court (New York) alleging trademark infringement and unfair competition. The suit seeks an injunction and damages.

The complaint alleges that Merck infringed the trademark Diurial by using the term "Diuril" in connection with one of its products recently developed as a diuretic.

Merck claims that it and its predecessors have sold a diuretic product with a Diuril trademark since 1900.

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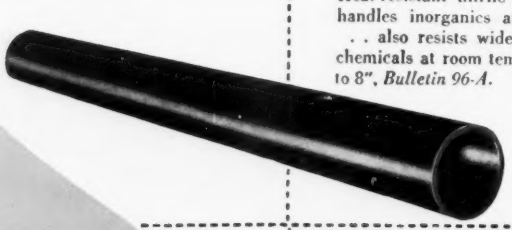

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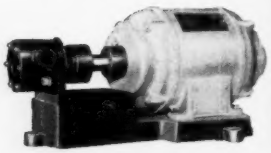

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ADMINISTRATION

WIDE WORLD

Senator McClellan: During his probing, unions found new unity.

LABOR

There may soon be a stronger voice to coordinate the activities of both major chemical unions—Oil, Chemical & Atomic Workers and International Chemical Workers Union. The voice, according to some labor observers, would be that of AFL-CIO's Industrial Unions Dept.

Both unions told *CW* last week that they have drawn heavily on IUD services in the past and expect to continue. IUD has, until recently, been little more than a clearing house for labor information. But, many believe, it may soon become a real service center for affiliated unions. It will attempt to coordinate bargaining programs of unions dealing in one industry and will assist them in developing strike strategy. Moreover, since IUD has been a project of United Auto Workers chief Walter Reuther, it's thought that many proposals made by it will reflect UAW ideas.

IUD's added strength is one manifestation, some think, of a more cohesive AFL-CIO, in part a result of the McClellan committee probes into labor and management practices. Reason: in submitting to such probes, the member unions gave over a measure of their autonomy to the parent union to accomplish the broad cleanup job they felt was necessary. As a consequence, the parent leaders found added strength and a greater degree

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X **Dairy Carton Coaters** add it to waxes for their cartons, getting longer shelf life and reducing flaking, leaking and bulging!

X **Food Packagers** like the smarter, glossier appearance of their packages—less rub-off and scuff. Printing looks better, too!

X **Box Makers** coat interior surfaces of corrugated cartons with an A-C POLYETHYLENE-Paraffin blend to eliminate the need for liners! Scratch from paper fibers on fine finishes is eliminated!

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ADMINISTRATION

of unity among their members than had existed prior to the probes. This added strength will no doubt be seen in many joint projects of the two big chemical organizations, among them the Industrial Unions Dept.

KEY CHANGES

Robert E. Sessions, to executive vice-president, Mead Johnson & Co. (Evansville, Ind.).

Don G. Mitchell, to director, ACF Industries.

Irb H. Fooshee, to president, General Chemical Division; and **Wilbur H. Brumfield** and **Cortez P. Hackett,** to vice-presidents, Solvay Process Division; divisions of Allied Chemical & Dye Corp.

Walter F. Rhoades, to vice-president of marketing, United Wallpaper (Chicago).

Nicholas J. Mead, to treasurer and director, Morningstar, Nicol (New York).

E. B. Newsom, to vice-president in charge of sales and sales promotion, Vick Products Division; and **W. D. Metzler,** to treasurer, National Drug Co. (Philadelphia); division and subsidiary, respectively, of Vick Chemical Co.

Vincent J. Romeo, to vice-president, legal; and **Richard S. Reamer** to vice-president, pharmaceutical manufacturing; Miles Laboratories (Elkhart, Ind.).

H. I. Edwards, to vice-president, marketing, Pfaudler Permutit (Rochester, N.Y.).

C. J. Windsor, to vice-president—manufacturing, Reichhold Chemicals (White Plains, N.Y.).

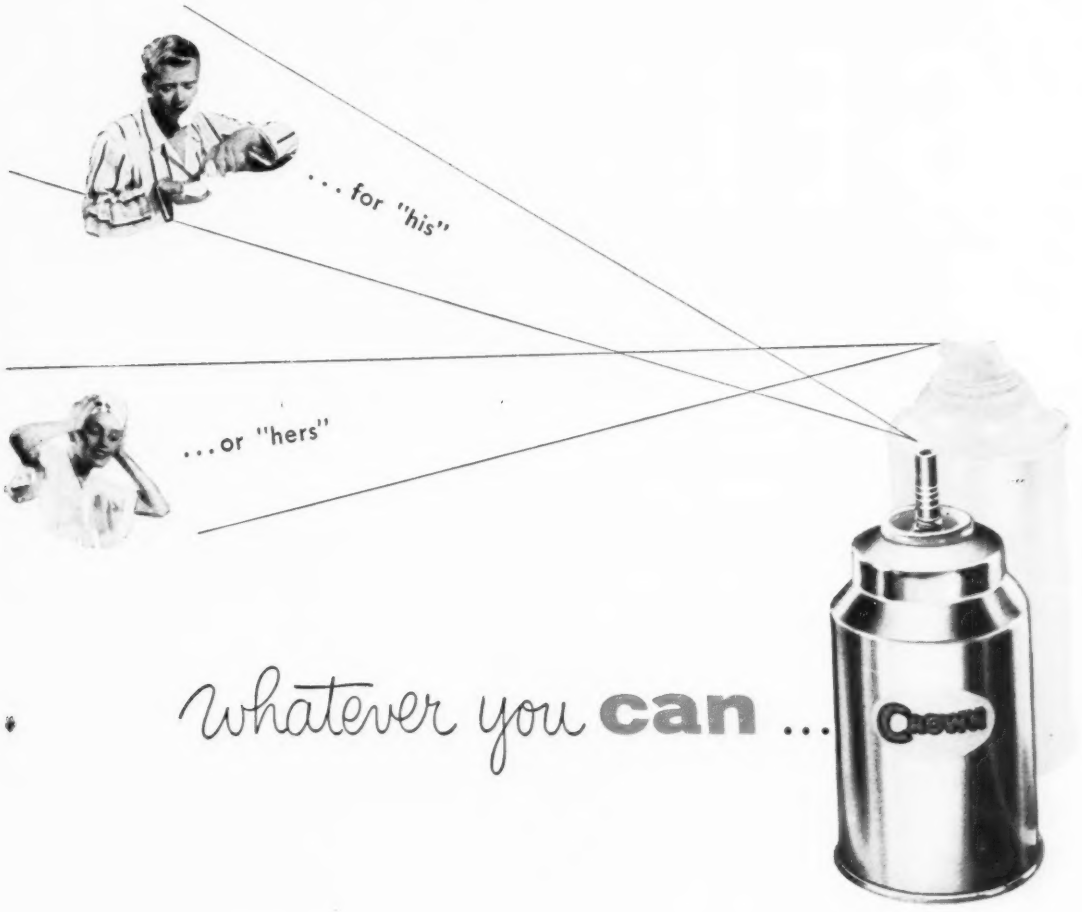
CONSULTANTS

George T. Bayley, to board chairman, Calkin & Bayley (New York).

DIED

Alfred W. Bays, 81, president, Abbott Foundation, and retired general counsel, secretary and director, Abbott Laboratories, at Evanston, Ill.

Edwin R. Bartlett, 74, director and former president, Hooker Electrochemical Co., at Sarasota, Fla.



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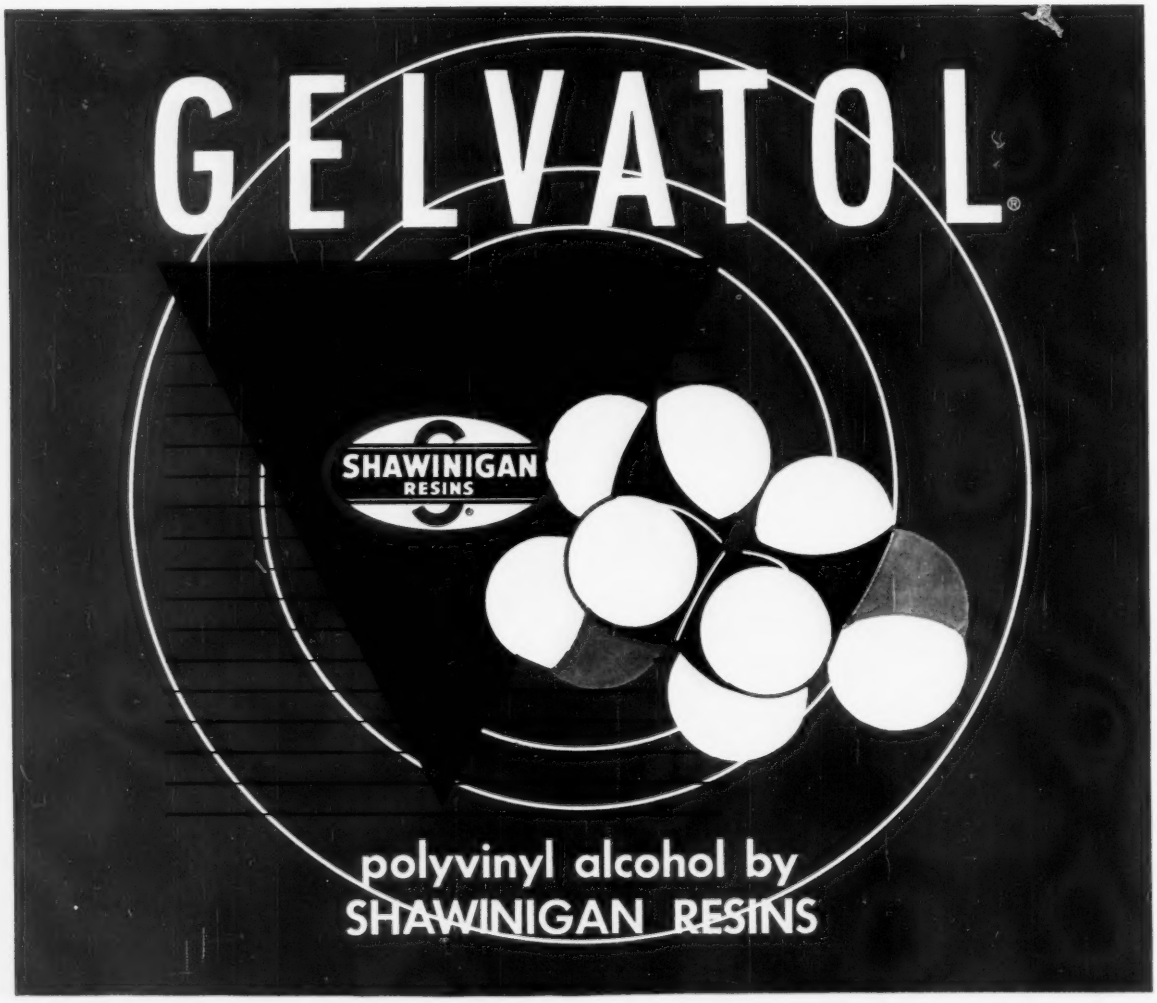

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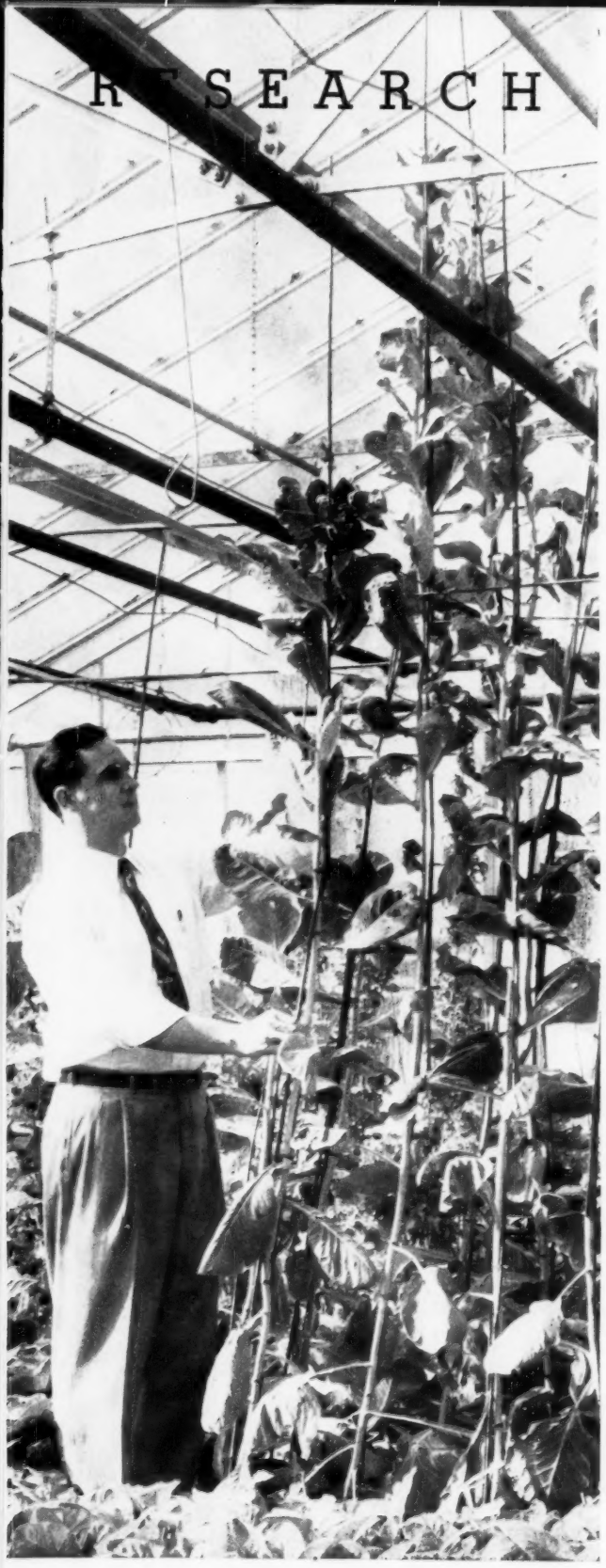


Michigan State horticulturist M. J. Bukovac studies gibberellin-stimulated cabbage stalks.

Gauging Gibberellin's Potential for Growth

By this week, the future for gibberellin was clearer than at any time since initial reports of the chemical's potential as a plant growth stimulant (*CW Technology Newsletter, June 23, '56*). The accumulated weight of scientific evidence indicates that gibberellin has some definite limitations but will find a market in selected uses.

Firms with a stake in its future—Pfizer, Merck, American Cyanamid, Abbott Laboratories, Eli Lilly—aren't dismayed. In the right applications, they feel, gibberellin may still find substantial markets when its full potentials and limitations are fully delineated.

States a new unpublished university study backed by Pfizer and Merck: "In celery production, seed production in radish and perhaps other long-day annuals, and for early fruiting and increased vigor of determinate tomato varieties, such as 'Fireball,' important benefits are now apparent and [gibberellin's] eventual use can be envisaged. With beans, cucumbers, muskmelons, peas, rhubarb and sweet corn, the potentially useful effects may not be realized without some control of accompanying unfavorable responses."

Spotty Results in the Garden: On treated sweet corn, for example, smut is more prevalent and often induced on leaves and stalks. Leaves of bush snap beans tend to wilt under the gibberellin treatment. Even celery, yields of which were increased 20-50%, was found to be more susceptible to "blackheart."

Imperial Chemical Industries Ltd.'s P. W. Brian calls crop yields "disappointing." On grass, for example, a single gibberellic acid treatment (2 oz./acre) accelerated growth and resulted in a 15-40% increase in yield. But subsequent cuttings from the same plot showed decreased yield, making the treatment's net effect "negligible."

Brian does think the acid might be used to some advantage on crops such as flax or hemp, but he cautions that there's been no field work to confirm this hope. Brian is not completely writing off the compound for commercial farm use, but he feels that a lot more field work must be done to evaluate the compound's agricultural prospects. And ICI, Britain's prime supplier of gibberellin, is reserving judgment on the market potential for the stimulant until such studies have been made.

A somewhat similar view has been expressed by Abbott Laboratories, which has an arrangement with

*A Japanese plant pathologist, E. Jurosawa, is credited with the discovery, 30 years ago, that a cell-free filtrate of the fungus *Gibberella fujikuroi* enhances the growth of rice seedlings. Since then, the filtrate has been found to contain gibberellin—a mixture of three similar compounds called gibberellin A_1, A_2 and A_3. Gibberellic acid (A_3), a tetracyclic dihydroxylactonic acid, is the principal component.

Velsicol Corp. (Chicago) for market development and sales of gibberellin, states that the market "appears to have narrowed since spring." Alfalfa treatment, for example, appears economically impractical.

Geographic Variations: Pfizer has found that tomatoes grown in different geographic areas may benefit to a varying degree from the treatment. Pfizer believes that the difference may result from variations in soil, sunlight, temperature and humidity—and that eventually any unfavorable responses due to varied growing conditions may be entirely eliminated. Gibberellin-treated plants have also been found to require more than normal amounts of water and soil nutrients to sustain their rapid growth. How much more must still be determined experimentally.

And not the least of gibberellin's drawbacks is its cost. Although the price has recently been lowered from $10/g. to $4/g., it is still high. (A gram can be diluted to 50 ppm., enough to treat an acre of certain crops.)

Different Evaluation: Abbott, for one, does not interpret the data on gibberellin as pessimistically as do some. It doesn't think the adverse effects of gibberellins are always significant. For example, damage to the edible parts of some plants might not be important when the plants are being grown for seed production.

Moreover, some crops are helped in a way that was not apparent in the early work.

Bolting-resistant varieties of sugar beets may become common in the U.S. as a result of a gibberellic acid treatment worked out by U.S. Dept. of Agriculture scientists at the Colorado Agricultural Experiment Station. (Sugar beets "bolt" when they cease leafy growth, send up tall seed stalks, which reduces the beet's sugar yield.)

J. O. Gaskill, USDA plant pathologist, was able to produce seeds of nonbolting beets by using gibberellic acid (1 part per 1,000 parts water) along with light and temperature treatment. Field studies must still be made to see if his technique is commercially feasible.

Vineyard Tryout: Recently, Merck revealed gibberellins will get a tryout on a California grape crop. Prof. Robert Weaver, University of California (Davis), is in charge of the project. He tells *CW* that grapes are a promising crop for gibberellin treatment—grapes are larger, and the clusters spread out, which prevents rotting. Grapes alone might command a $9-million/year gibberellin market.

Gibberellin can also induce growth in plants that have been stunted by a virus disease, although it apparently does not contribute to disease resistance. A major trait in gibberellin's favor is its lack of toxicity. S. H. Wittwer, Michigan State University (East Lansing) horticultural scientist, has found that gibberellin is absorbed but not stored in treated plants, has no toxic effect on animals, and leaves no residue at harvest time. Also, gibberellin-like substances occur naturally in some plants.

Food & Drug Administration disapproval of the product is therefore considered unlikely.

There's no question that gibberellin will continue to get considerably more research. Merck, for example, has established 30 new grants-in-aid for the purpose at leading agricultural research centers. More than a 1,000 scientists, throughout the country, are now probing the growth stimulant's future.

Other research targets of gibberellin producers: better and less costly ways of making the compound; chemically modifying it to make it less vulnerable to soil organisms; prolonging its activity in field use; altering its vapor activity in order to facilitate treatment of seeds.

Meanwhile, gibberellin has no competition as a plant growth stimulant. Nor is it protected by patents. Until a better one comes along, the product is assured of a heaping measure of interest and scientific scrutiny.

APPARATUS

Solions: The solion *(CW, July 27, p. 38)*, an electronic device that may replace the transistor at frequencies below 100 cycles/second, is being developed jointly by National Carbon Co., division of Union Carbide, and Texas Research Associates. W. H. Fritz, National Carbon (Cleveland), is handling inquiries.

•

Sun Spotter: A mobile solar furnace is now available from American Searchlight Corp. (New York). Price: $8,500.

EXPANSION

• Abbott Laboratories (North Chicago) has broken ground for five new buildings on its research farm near Mundelein, Ill., plans expanded research in animal growth stimulants, hormones, tranquilizers, etc.

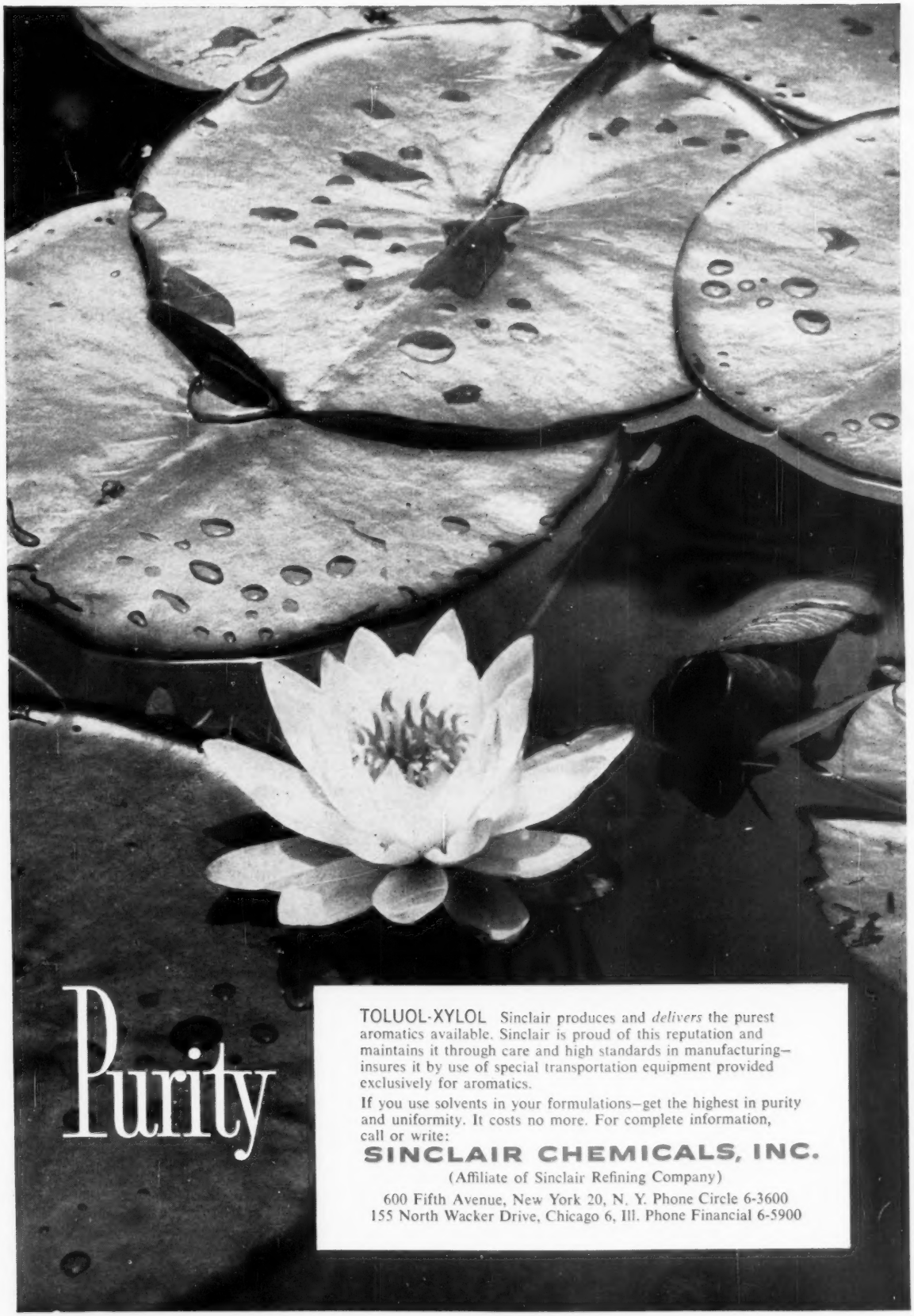
• Yuba Consolidated Industries, Inc. (San Francisco), plans a new center for research and development of its products in the heat transfer field (e.g., heat exchangers). The center will be located at Benicia, Calif.

• Black Hills Power & Light Co. (Rapid City, S.D.) has joined the

Nub of the Gibberellin Story

It does aid plant growth and health, is nontoxic to humans, can be easily applied at any stage of crop growth.

But gibberellin is costly; some crops are adversely affected; and the same crop may react differently in different geographic areas. Also gibberellin-treated plants require more water and soil nutrients to sustain growth.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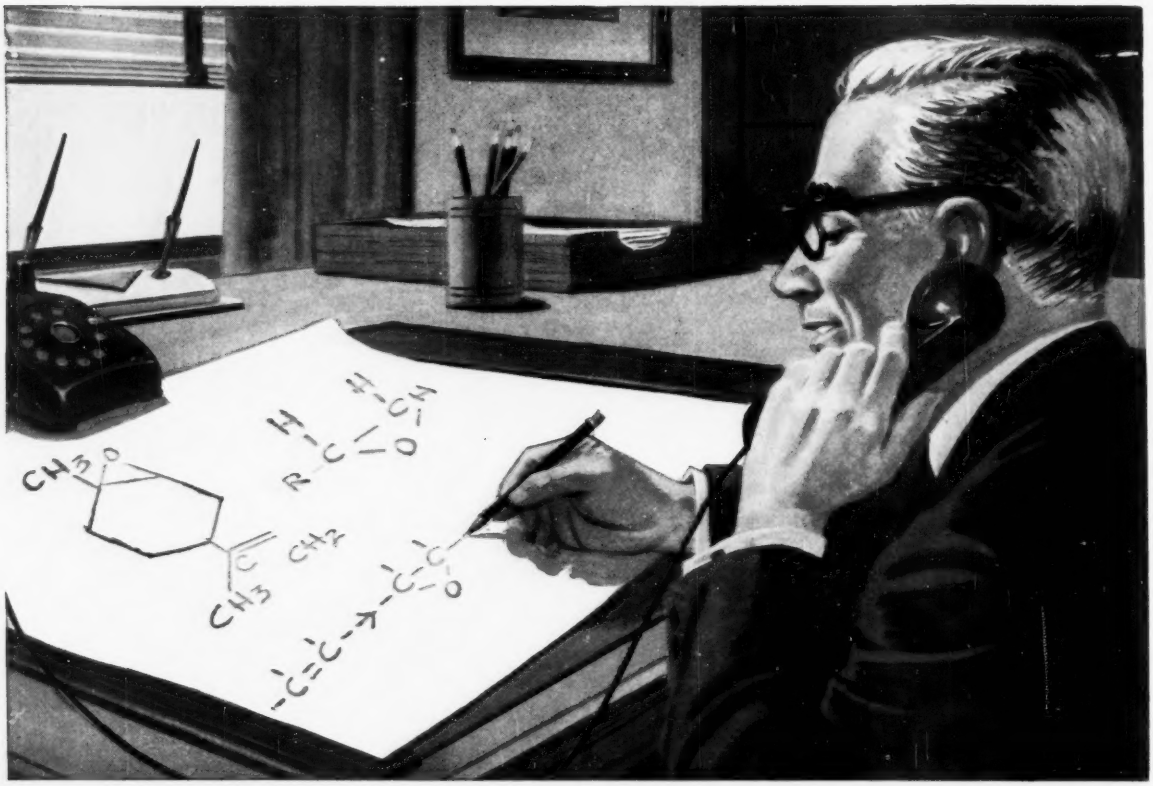

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RESEARCH

Wyoming Natural Resource Board, University of Wyoming, and several companies in a cooperative coal-tar research program. Object: to find new uses for Wyoming coal.

• Pilot Chemical, Inc., formerly located in Waltham, Mass., has moved to larger facilities in Watertown, Mass. It will continue research in organic scintillation materials for specialized radiation detection applications.

PRODUCTS

Key Blocker: For "blocking" ketone groups in organic synthesis, Union Carbide Chemicals Co. (New York) offers a new intermediate, 2-methyl-2-ethyl-1, 3-dioxolane. It protects selected ketone groups on complex molecules during chemical reactions, is known to be effective in synthesizing hormones (e.g., testosterone and progesterone). It's also suggested for possible use as a reaction medium or extraction solvent.

•

Missile Grease: A new class of greases for high-temperature applications in missiles and supersonic planes has been developed by Shell Oil Co.'s Martinez, Calif., research laboratory. Called Shell ETR (extreme temperature range) greases, the products withstand 600°F, contain an organic vat dye as a thickener.

•

Urethane Entries: Union Carbide Chemical (New York) offers four new intermediates for making urethane foam. Trademarked Niax, the newcomers are propylene oxide addition products of 1,2,6-hexanetriol.

Quick Check on Ink Volatiles

Printing ink research goes a lot faster with the help of this new apparatus at Sun Chemical's graphic arts lab in East Rutherford, N.J. It automatically determines the evaporation rates of pure solvents or solvent mixtures. Called the Sun Evaporometer, it's so sensitive it can measure weight changes as small as 1/10,000 g. It replaces lengthy, tedious, less accurate manual weighing of solvent samples.

Development of inks that dry quickly (in a few hundredths of a second) has been forced by the trend toward higher-speed presses. Since most inks use mixtures rather than single solvents, evaporation rates are normally hard to predict or measure. Sun Laboratory's director, Joseph Curado, thinks the device should prove valuable also to other ink and coatings researchers.

New uses found for **Metallic Oxide Pigments**

Today new product planners and production engineers are finding uses for the unique physical and chemical properties of metallic oxides which are surprisingly far afield from traditional usages.

Below is a review of their characteristics. Look them over. You may get the germ of an idea which will lead to the improvement of existing products . . . or to the reduction of new product manufacturing costs.

We'll be glad to cooperate with you in exploring the possibilities. Address Dept. 20, C. K. Williams & Co., Easton, Penna.

Name	Properties
Pure Red Iron Oxides and Kroma Reds	Fe_2O_3-98.5% SpG.-5.15 Color—Salmon to purplish red
Pure Yellow Iron Oxides	$Fe_2O_3.H_2O$-99% SpG-4.03 Color—Lemon to dark orange
Pure Black Iron Oxides	Fe_3O_4-96% min. SpG.-4.96 Color—Blue Black
Pure Chromium Oxides (and Hydrates)	Cr_2O_3-99% SpG.-5.20 Color—Light to dark green
Natural Oxides—Ochers, Umbers, Siennas, Metallic Browns, Red Oxides	Wide range of ferric oxide content and red, yellow and brown colors
Venetian Reds	Fe_2O_3-40% SpG.-3.45 Color—Light to med. red
Cuprous Oxide	Cu_2O-97% min.
Extenders—Barytes, Calcium Carbonate, Calcium Sulfate, Silica	Wide range

Characteristics

Composition: The basic colors of the iron and chromium oxides are determined by chemical composition. Reds are ferric oxide (Fe_2O_3); yellows, hydrated ferric oxide ($Fe_2O_3.H_2O$); blacks, ferro-ferric oxide (Fe_3O_4); and greens, chromic oxide (Cr_2O_3). All these compounds are chemically stable and light permanent.

Particle Shape: Physical properties such as oil absorption and suspension characteristics are dependent on particle shape, controlled by manufacturing processes.

Size: Color range is controlled by particle size—average size increases as color darkens. Uniformity of size determines brightness.

Purity: Freedom from impurities is essential for superior pigment properties and to prevent deleterious effects in end-products. Control of soluble salts, manganese and copper content are an important part of the Williams manufacturing operation.

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Technology
Newsletter

CHEMICAL WEEK
January 11, 1958

Inert dusts have been found to be effective termite control agents. Walter Ebeling, professor of entomology at the University of California, found that a spray of highly sorptive clays of the Fuller's earth type or silica aerogels could knock out drywood termites quicker than any insecticide now on the market.

This is how it works: The dusts are applied on the wood by blowers used in conventional fumigation with methyl bromide. Termites crawling over the wood become coated with the dusts. This absorbs the oils and waxes that are the mite's only protection against drying out—they die within one to three hours.

According to Ebeling, the nontoxic dusts will stay on wood surfaces indefinitely, should provide a permanent protection against re-infestations.

•

A new process for making heavy water is being tested on a small scale by Professor Erwin W. Becker, of Marburg University in Germany. Becker catalyzes a liquid-phase exchange of deuterium between hydrogen and water. Right now, he's unwilling to discuss the catalyst or the conditions of the operations. But he plans to install pilot equipment used at Marburg in the isotope research lab planned for the first German-designed test reactor at Karlsruhe.

U.S. researchers have shied away from a liquid-phase exchange. Although the system is inherently attractive, they have not yet been able to uncover an efficient catalyst for the job. Thus, Becker feels that his work may shed some new light on the theory and practice of heavy-water production. Although it is too early to assess the economics of his work, he thinks that eventually a liquid-phase catalytic process may offer stiff competition to the presently established processes.

•

Biggest contract for screening cancer-combating chemicals has just been awarded to Chas. Pfizer & Co. The firm will receive $1.2 million from the government to screen its antibiotic filtrates and other organic compounds for effectiveness in fighting cancer. The one-year contract was signed with the Cancer Chemotherapy National Service Center of the National Institutes of Health (Bethesda, Md.). Pfizer will carry out the study at its Maywood, N. J., labs.

The latest contract is half again as large as the combined total ($793,000) of the first six such cancer-drug contracts (*CW, Dec. 14, '57, p. 58*).

•

New insecticides with low toxicity toward warm-blooded animals are being investigated by researchers of the U.S. Dept. of Agriculture. It has screened 200 esters of chrysanthemumic acid, found five that look

good. The two most promising (esters made from the acid and 6 bromo- and 6 chloro-piperonyl alcohol) are equal to or better than either pyrethrum or allethrin at obtaining high levels of kill. They are, however, somewhat slower in "knockdown."

Acute toxicity tests on warm-blooded animals indicate that members of this new series are only one-eighth as toxic as pyrethrum, one-third as toxic as allethrin. Pyrethrum and allethrin have been considered the safest of insecticides.

A commercial synthesis has yet to be worked out for the new insecticides. But the route to chrysanthemumic acid has been fairly well explored because it is one of the key intermediates in allethrin manufacture (*CW, Jan. 24, '53, p. 38*). Researchers feel that the new compounds will be more expensive to make than DDT and other chlorinated hydrocarbons, but cheaper than allethrin.

•

Hydrogen refining of coke-oven benzene is meeting its first English test. Newton Chambers and Co. Ltd. is now operating a pilot plant designed to desulfurize 500 gal. of crude benzene daily. The process being employed was designed jointly by the company and Coal Tar Research Assn. The British benzene being treated contains more than 2% sulfur.

In this country, the same idea is being used in two commercial installations (*CW, Dec. 14, '57, p. 64*).

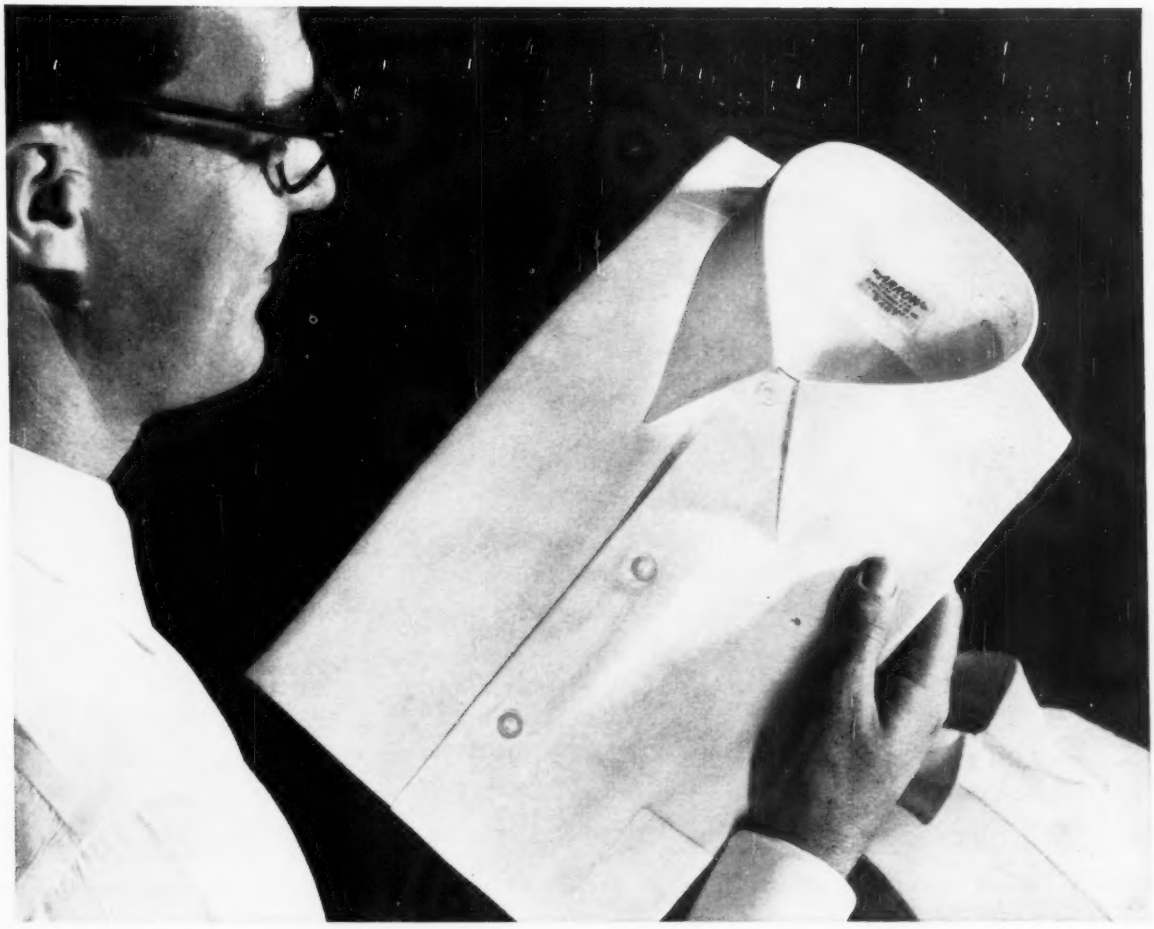
•

And the phenol-from-cumene process will be used in a plant being built in Scotland by British Hydrocarbon Chemicals Ltd. The company is jointly owned by British Petroleum Co. and Distillers Co. Distillers did some of the original work on the cumene process. The plant, located at Grangemouth, is due to start up around the middle of next year.

•

That Presidential plan for boosting the supply of engineers and scientists is meeting with a cool reception from the National Society of Professional Engineers. President Eisenhower has proposed federal scholarships for 10,000 undergraduates for each of the next four years.

But as Clark Dunn, vice-president in charge of educational matters for the society, sees it, this would "complicate and aggravate an already-serious situation in the colleges." Dunn reasons that tuition payments cover only a portion of the funds spent by a college in providing educational opportunities, and that the difference must come from public or private contributions. He feels that the influx of 40,000 students on the already-strained facilities of engineering schools will put an almost impossible burden upon them.



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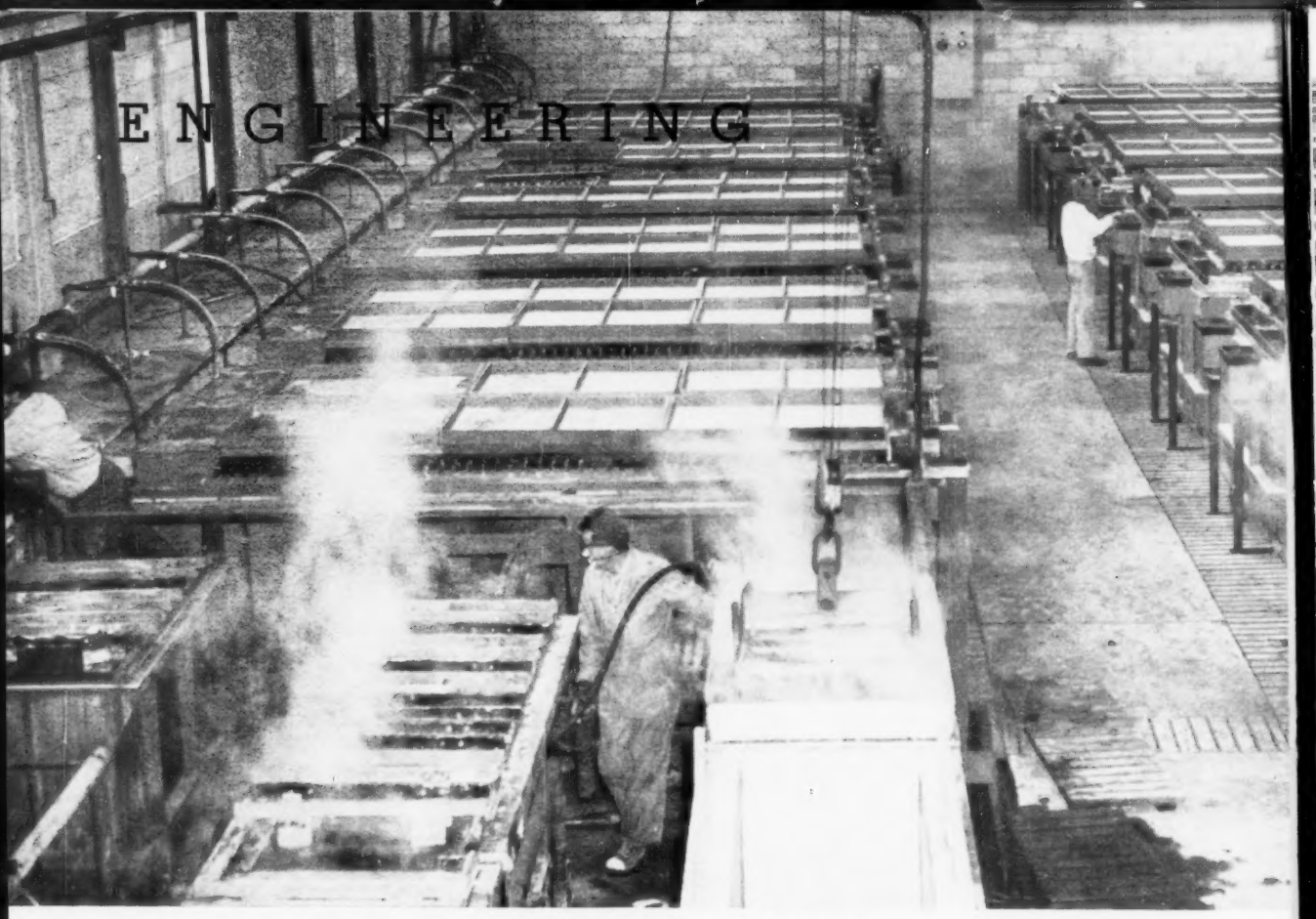


Calera Mining streamlines cobalt recovery process at Garfield refinery, employs batteries of electro-

Continuous Recovery Cuts Cost, Boosts Yield

With the recent startup of its new 8,000-lbs./day electrowinning plant (above), Calera Mining Co. completed the first phase of a $750,000 revamp of cobalt production processes at its Garfield, Utah, refinery. The next step—installation of a relatively inexpensive denickeling process—is scheduled for later this year. It will enable Calera to turn out cobalt chips of 99.8% purity.

The chief impetus behind both processing modifications is the impending change in type of Calera's customers. So far, the entire output of granular cobalt metal from the Garfield refinery has been going into General Services Administration's strategic materials stockpile. But with the end of government stockpiling in sight, the company is preparing to enter into the worldwide competitive sales market in non-Communist countries.

From all indications, a low-cost method of producing high-purity cobalt is vital to success in the open market. J. S. Mitchell, Calera plant manager, points out that the world market price for cobalt has dropped from $2.60/lb. to $2/lb. in less than two years. And although they are now paying less, these consumers are looking around for higher-purity metal, he points out.

Calera's soon-to-be-built denickeling unit, which will remove the 2% nickel contained in its present cobalt, will put the firm in a prime supply position by '59, says Mitchell. And not only is the switch to electrowinning expected to be less costly than the original hydrogen reduction of cobalt to metal; it's also expected to increase by 4-5% the output of the plant, which was rated at 8,000-lbs./day.

New Twist on Old Route: The new electrowinning process used at Garfield was perfected by Martin Fassell, director of Howe Sound Co.'s Salt Lake City research laboratories. (Calera is a subsidiary of Howe Sound.) Basically, the process is similar to the Rhodesian (South African) cobalt-reduction process, but it incorporates some refinements worked out in the company's 250-lbs./day pilot plant (*CW Technology Newsletter Feb. 4, '56, p. 70*).

Electrowinning is distinguished from electrolytic refining by differences in cell operation: electrowinning employs insoluble anodes and cathodes, extracts metal from a continuously recirculated electrolyte. Electrolytic refining utilizes anodes of impure metal, which are

winning cells in place of hydrogen-reduction method.

# of High-Purity Cobalt

soluble in the electrolyte, and refines the product by plating it out on a cathode (starter sheet) of high-purity metal.

With the exception of the final metal recovery step, Calera's cobalt-extraction process follows the original route developed by Chemical Construction Co. Ore from the company's Blackbird mines is first acid-leached under oxidizing conditions to convert contained sulfides into sulfate. Iron is precipitated as ferric hydroxide and filtered out with the gangue. After it is additionally treated for the removal of copper and arsenic, the purified solution of cobalt sulfate is ready for reduction to the metal.

In the original process, the cobalt sulfate ($CoSO_4$) solution was made ammoniacal and hydrogenated under pressure to reduce the salts to metal. The product was a powdered mixture of cobalt and nickel (as high as 5% Ni), which had to be processed further to obtain the metal in granular form.

Under the new system, the cobalt sulfate solutions from the digestion-filtration section of the plant are converted into hydroxide by treatment with calcium hydroxide. Gypsum ($CaSO_4 \cdot 2H_2O$) is filtered out of the solution and sent to waste; cobalt hydroxide is added as makeup to the continuously recirculating cobalt sulfate electrolyte in the tank house.

Electrolyte containing 45 grams/liter of cobalt is circulated through 28 electrolytic cells. Total voltage across the tank house is about 150 volts—or roughly 4.5 v. per cell. The cells are equipped with insoluble lead anodes, cathodes of stainless steel sheet that have been specially treated with phosphoric acid to ease subsequent stripping of the metal deposit. About 10 grams/liter of cobalt is removed from the electrolyte in a pass through the 24 cells. Electrolyte, down to a cobalt content of 35 grams/liter, is withdrawn continuously from the cells and recycled to the cobalt makeup system.

One outstanding advantage of the electrowinning process is its continuous operation. (The hydrogen-reduction method was a batch process.) The entire metal-deposition process is controlled automatically by instrumentation installed by Leeds & Northrup Co. And Calera is looking for other ways to substitute labor-saving methods for tedious manual operations.

Stripping metal deposits from the reusable cathodes will be one of the first jobs to be streamlined. It takes seven days to build up the required deposits of cobalt, after which the metal must be broken off in chips. At present, the chipping is done with hand tools, but the company is scheduling the use of power hammers to simplify this job.

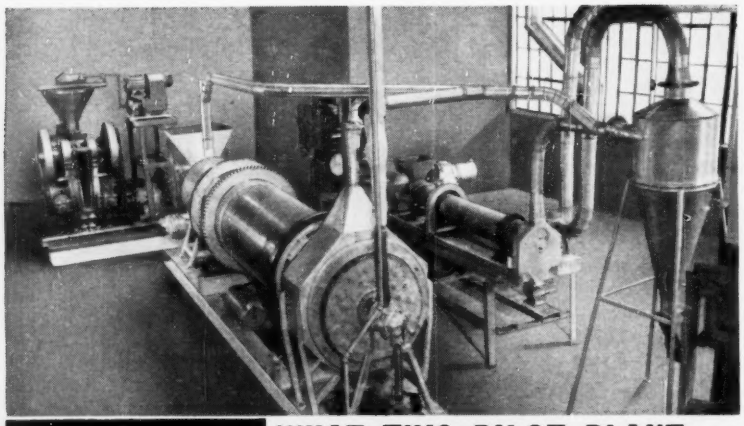
Calera granulates the cobalt chips for sale to the government. And though this operation is simpler than making granules from the powdered hydrogen-reduced product, it can probably be eliminated when the metal goes on the open market in the form of cast chips.

With the addition of the denickeling unit, however, one more step will be required. To remove slight sulfur-staining, the pure cobalt will have to be treated with chromic acid before it is cast into the chips for shipment.

Smooth Startup: As a result of its thorough-going pilot-plant development of the new electrowinning technique, Calera apparently experienced little difficulty in making the switch from the hydrogen-reduction process. Startup of the original process, by contrast, was plagued by a number of unforeseeable operating difficulties (*CW, Sept. 26, '53, p. 49*) that took over two years to solve.

American Cyanamid—at that time corporate parent of Chemical Construction Co. (Chemico is now owned by Electric Bond and Share)—operated the Garfield refinery until the bugs were worked out, turned it over to Calera in Feb. '56.

Chemico-engineered extraction processes, similar to Calera's hydrogen-reduction method, are presently employed by Sherritt-Gordon Mines Ltd. in Canada, and by National Lead Co. at Fredericktown, Mo.



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ENGINEERING

Boost in Nuclear Power

Argonne National Laboratory last week disclosed results of recent experiments that may well be one of the most important steps towards the nation's goal of economically competitive nuclear power. ANL's team was able to more than double the designed heat output of its experimental boiling-water reactor, and attain a new high-operating-power level.

This accomplishment, says Bernard Spinrad, director of Argonne's reactor engineering division, indicates that electrical output of the plant could be substantially increased, thereby reducing the cost of plant investment per unit of power. Power costing around 20 mills/kwh. will be economic in some areas, says Spinrad. The recent experiments show that power at that figure is near. He cautions, however, that generally economic power still seems relatively far off.

Designers' Gain: ANL increased the nuclear heat from 20,000 to 50,000 kw. without altering the number or arrangement of fuel elements in the EBWR's core. Even higher levels —and operating efficiencies—may be attainable with minor modifications. Joseph Harrer, project manager on the EBWR, says there are indications that the maximum stable power level of the present core is "several times higher than 20,000 kw.," may be as high as 100,000 kw. of heat (25,000 kw. of electricity).

Design Tips: Perhaps the most important contribution of ANL's experiments is the information they provide for the design of larger reactors. For though reductions in operating costs are only part of the solution of the problem of nuclear economics, potential savings obtainable through optimum reactor design are worth seeking.

For example, says Harrer, if output of the EBWR were raised to three times the initial design rating, operating costs would be reduced from an estimated 52 mills/kwh. to about 32 mills/kwh. And by utilizing four reactors of this type in one multiple-reactor station, operating costs could be dropped to about 12 mills/kwh.—partly because of lower fuel fabrication costs.

Proved Safety: Another important fact emphasized by the high-power-level tests is the inherent safety and

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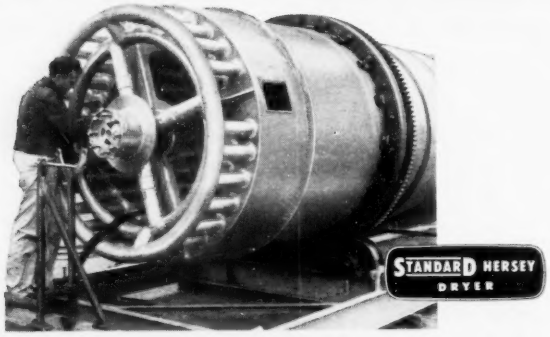

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stability of the boiling-water reactor system. To attain the 50,000-kw. heat output, the EBWR's control rods were withdrawn beyond designed operating level. This permitted water in the core to boil at a higher rate, resulted in faster recirculation and heat removal from the core. But as a result of familiarity gained from 15,000 kw.-days of operation at lower levels, it was actually safer to bring the EBWR up to the 50,000-kw. heat level than it was to get the system to 20,000 kw. orginally.

Says Harrer: We hope to demontrate soon how this plant, physically the simplest of any nuclear-powered unit, can be built and operated safely and economically for widespread use in populated areas.

PROCESSES

Acetylene-Ethylene: M. W. Kellogg Co. (New York) now offers a continuous process of making acetylene and ethylene by the partial oxidation of naphtha or natural gas feedstocks. Société Belge de l'Azote originated the process, cooperated with Kellogg to perfect it for commercial use. Essential to the method is an SBA-developed burner that's said to be easy to control and to permit stable continuous operation. With naphtha feedstock, the process produces a wide range of mixtures of acetylene and ethylene. With natural gas feed, it turns out acetylene with negligible amounts of heavy impurities. Blaw-Knox Co.'s Chemical Plants Division has also offered an acetylene-from-natural gas process based on the Belgian company's process (*CW, May 18, '57, p. 114*).

•

Low-Cost Oxygen: By combining several previously distinct processes, Air Products, Inc. (Allentown, Pa.), has come up with a system that, it claims, produces oxygen with unusually high efficiency. Key to the new system, now installed in two air separation plants at Jones & Laughlin's Aliquippa Works, is a combination of air compressors and two separate heat exchangers. These substantially reduce the power input per ton of oxygen produced. In addition to 230 tons/day of high-purity (99.5%) oxygen, the plants provide high-purity (99.9%) nitrogen and ultrapure liquid argon as by-products.

CHEMICALS OUTLOOK

January, 1958

This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request : . . may we serve you?

HALANE SHOWS PROMISE AS RUBBER RETARDER

Tests in Wyandotte laboratories have indicated Halane* (dichlorodimethylhydantoin) shows promise as a retarder in rubber compounding. Results of these tests have been confirmed by commercial users.

Halane was compared in the laboratory with five other commercial materials: (1) a phthalic anhydride-type retarder; (2) a trichloromelamine-type retarder; (3) a nitroso diphenyl amine-type retarder; (4) a benzoic acid-type retarder; (5) a salicylic acid-type retarder. At an equal concentration, in a variety of rubber compounds, Halane gave a higher degree of retarding action than the others tested.

For further information on Halane as a rubber retarder, write us on your company letterhead. Address your inquiry to Department CO for prompt attention.

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Using Purecal* SC as a reinforcing agent, white-sidewall tire and similar rubber stocks have been developed in our laboratory which duplicate the physical properties found in stocks made with zinc oxide. Many properties, such as resistance to color changes upon aging, were superior to those of stocks made with zinc oxide. Purecal's lower cost effects important savings in this area of rubbermaking.

Purecal SC is Wyandotte's coated ultrafine calcium carbonate. It disperses readily, and is entirely different from other coated calcium carbonates on the market. Samples and further information are available.

PROGRESS REPORT ON FLO-CHILLED CAUSTIC SODA

Since its introduction, great interest has been shown in Wyandotte Flo-chilled** Caustic Soda by both domestic and foreign sources. Sales have reflected this enthusiastic response from both consumers and distributors, and have continued to climb steadily, even into the winter months. Primary reason: Caking, the No. 1 enemy of caustic, is no longer a problem, due to free-flowing characteristics imparted during the Flo-chilling process. And, although this is a problem usually encountered only during hot, humid weather, many users report continued use of Flo-chilled caustic the year round for assurance of flowability.

As a result of this growing popularity, production of Wyandotte's Flo-chilled Caustic Soda is being increased to keep pace with demand.

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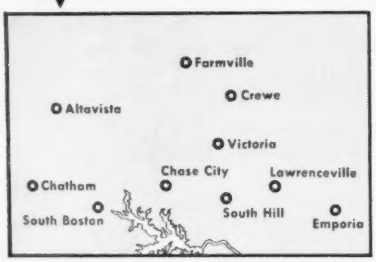

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Today, Southside Virginia gold is a blend of unusual competitive advantages for your plant. Industries here have nearly doubled in two decades. Yet you can still draw on large reserves of man and woman power to help you profit by this area's forest and mineral resources, and nearby supplies of coal and other raw materials.

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To power your growth, Vepco's modern network now has 640,000 kilowatts of new generating capability under construction—building toward a total of 2,171,900 kw in 1960. For confidential site finding help in this land of fine industrial water, mild climate, thrifty government and pleasant living . . . write, wire, or phone Vepco, serving "The Top of the South" in Virginia, West Virginia and North Carolina.

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Clark P. Spellman, Director—Area Development, Electric Building, Richmond 9, Virginia • Phone: MIlton 9-1411

Market Newsletter

CHEMICAL WEEK
January 11, 1958

U. S. reinforced plastics use in '58 will increase 20%, matching the percentage gain made in '57. This forecast, from the reinforced plastics division of the Society of the Plastics Industry, includes an estimated demand for 200 million lbs. in '58. One caution: the society's forecasts in past years have been overly optimistic (*CW, Dec. 14, p. 85*).

Biggest outlet for reinforced plastics in the U. S., says the society, was the transportation industry. It took 33.6 million lbs. of the total 168 million lbs. used in '57. About half of the transportation requirement was for premix and molding materials—the one category that outpaced the industry as a whole in percentage growth.

Four consuming industries—aircraft and missiles, boats, construction, consumer products—each took 25.2 million lbs. of reinforced plastics in '57. Another 5.04 million lbs. went to the appliances industry and a like amount to makers of containers and trays (excluding tanks and ducts), and to electrical equipment manufacturers. Some 3.36 million lbs. went into the manufacture of pipe, tanks and ducts; miscellaneous applications took 15.12 million lbs.

•

More optimistic forecast—25% increase in sales of reinforced-plastic panels in '58—comes from one manufacturer. David S. Perry, president of Filon Plastics (California), predicts that panel sales in '58 will reach 62.5 million sq. ft., worth about $43.75 million on the retail level.

Incidentally, each year a larger proportion of total U. S. reinforced-plastic panels goes into industrial applications. One-third of all the panels produced in '56 were for industrial use—the rest went into residential applications. In '57, industrial buyers took 40% of total sales, will likely take 50% in '58.

•

On the way in is production of trimethylolpropane at the new 10-million-lbs./year Celanese plant at Bishop, Tex. Price of the material—used primarily in manufacturing polyurethane foam—is reduced from the previous 41¢/lb., to 39¢/lb., delivered, truckloads.

•

On the way out is Canada's sole producer of cellulose sponge. Heavy competition by foreign-made products, made possible by "inadequate tariffs," is forcing Du Pont of Canada to discontinue sponge production at Shawinigan Falls, Que.

One specific trade condition that led to closing of the plant: other man-made sponges—e.g., those made of polyurethane—enter Canada duty-free. Also a contributing factor, according to Du Pont: foreign manufacturers of cellulose sponges legally circumvent the 20% Canadian tariff by shipping in large volumes of "waste material." This, Du Pont

says, is "often indistinguishable in appearance, but not in performance, from good-quality sponges." An added hardship is the 40% duty on sponges entering the U. S., which effectively closes this market to Canadian manufacturers.

•

Communist China will buy $20 million worth of fertilizers from Japanese manufacturers. The contract, to be signed early this month, calls for shipment of 400,000 tons of ammonium sulfate and 20,000 tons of superphosphate of lime. The Chinese will pay $50.24/ton for the sulfate, $33.60/ton for the superphosphate.

•

A unique ore "tanker" will begin trans-Caribbean ferry service next year. The custom-converted ship will link Freeport Sulphur's new nickel-cobalt project now under construction at Moa Bay, Cuba (*CW, Dec. 28, '57, p. 43*), with its refinery and raw-material sources in Louisiana. On each round trip the vessel will tote about 5,800 tons of molten sulfur and 140 tons of liquefied petroleum gas, both used in initial processing of raw ore, to Cuba, and return with some 2,400 tons of slurried concentrates of nickel and cobalt sulfide. Two agitators will keep the slurry properly mixed for unloading by pipeline from the ship's 8 rubber-lined concentrate tanks. Bethlehem Steel will handle the conversion of the ship.

Incidentally, output from the Moa Bay properties is expected to begin in mid-'59, and should total about 50 million lbs. of nickel metal and some 4.4 million lbs. of cobalt annually. The $119-million project, says Freeport, "will increase the U.S. supply of nickel 15-20%."

•

Kolker Chemical has started production at its new dimethyl phthalate and diethyl phthalate plant in Newark, N.J. Annual capacity: 50 million lbs./year of plasticizers including phthalates, phosphates, and epoxy types.

SELECTED PRICE CHANGES — WEEK ENDING JANUARY 6, 1958

UP

	Change	New Price
Acetanilide, tech., flakes, bbls., bgs., c.l., frt. alld.	$0.02	$0.325
Ammonia, anhyd., fertilizer, tanks, wks., frt. equald., ton	4.00	88.00
Ammonium nitrate, dom., fertilizer grade, bgs., 33.5% N, Western, wks., frt. alld., base price, ton	4.00	72.00
Barium carbonate, precip., bgs., c.l., wks., ton	5.00	111.50
Barium chloride, l.c.l., anhyd., bgs., wks., ton	5.00	196.00
Borax, anhyd., tech., 99.5%, bgs., c.l., wks., ton	4.50	87.50
Butyl sterate, dms., c.l., frt. alld., E. of Miss.	0.015	0.2725
Nitrogen solution, tank, frt. equald., per unit of N	0.04	1.28
Tankage, animal feeding 9-11% ammonia, Chicago, bulk, ton	0.25	5.75

All prices per pound unless quantity stated.

New Mexican *Tri-Sure*® Plant

brings ***Tri-Sure***® *service to Mexico and Central America*

New Tri-Sure Plant at Avenida No. 1 y Calle Piramide, Naucalpan, E. de Mexico, Mexico

Another link in the international chain of plants that comprises "Tri-Sure* the World Over," this modern new factory near Mexico City is producing Tri-Sure Seals, Plugs, Flanges, Nozzles and Caps—which give the contents of drums and pails positive protection from *leakage*, *seepage* and *contamination*.

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Tri-Sure S/A Industria e Comercio, San Paulo, Brazil
American Flange & Manufacturing Co. Inc., Villawood, N. S. W., Australia
Compania Mexicana Tri-Sure S/A, Naucalpan, E. de Mexico, Mexico
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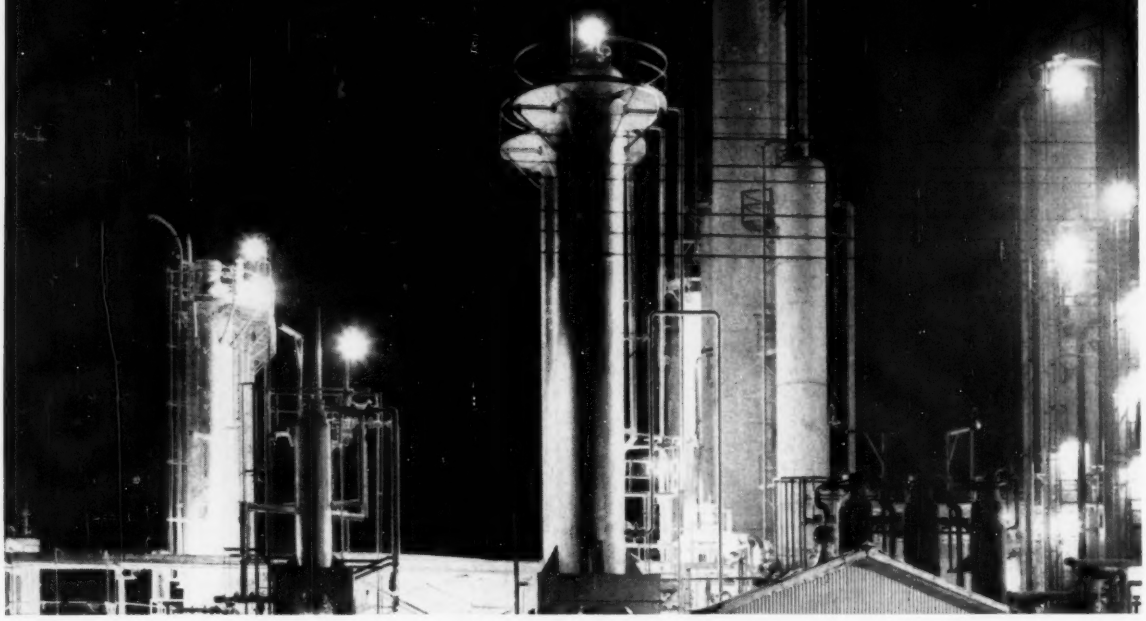

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MHI *Metal Hydrides Incorporated* CHEMICAL HYDRIDE DIVISION

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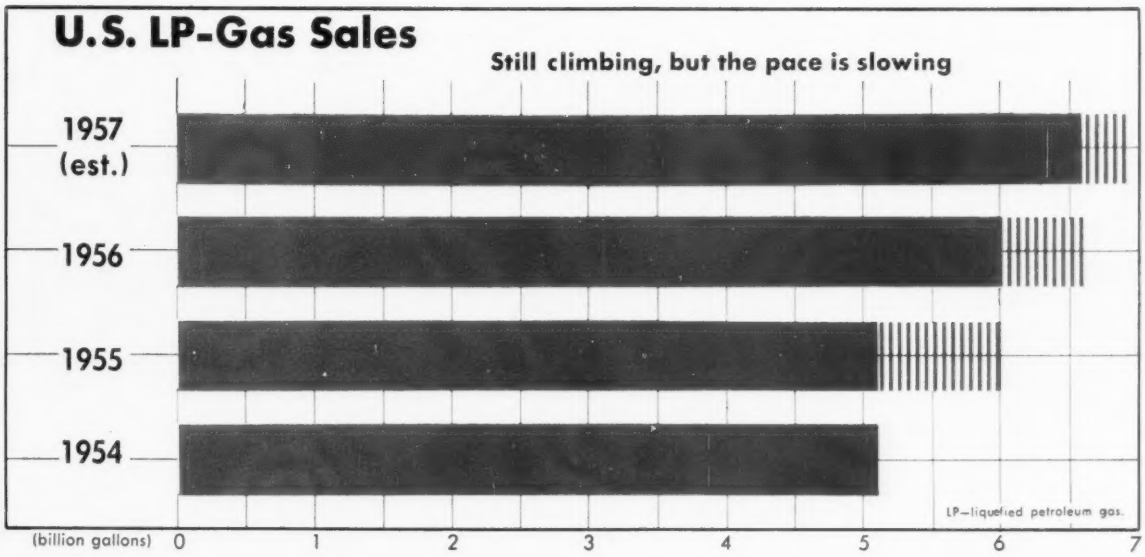

LP-Gas Sales: Slower Pace—Bright Outlook

Producers of liquefied petroleum gas this week aren't wasting time looking at last year's records. Their sights are on the future. Reason: sales of LPG in '57 increased a slim 4.1% over '56 sales—an unimpressive advance, compared with the 17% hike in '55 and the substantial 10.6% gain in '56. But there's still a good chance that sales will hit an expected 10-billion-gal./year rate by '65.

There's hope, too, that by '65 LPG supply/demand will be in closer balance than in recent years. In '56, for example, U.S. production totaled 8.5 billion gal., 1.9 million gal. more than consumption. By '65, some observers think, the margin will be whittled down considerably.

Forecast Problems: But perhaps these expectations should be considered more a target than a forecast, because industry experts encounter considerable difficulty even when estimating current LPG sales.

Phillips Petroleum's recently released annual LPG report (authored by George R. Benz, W. F. DeVoe and Paul W. Tucker) contains significant revisions of the '56 LPG data reported last year by the same group.

For example, the estimated billion-gallon increase in "marketed production" of LPG in '56 turned out to be highly overoptimistic. Actual total LPG sales that year amounted to about 6.6 billion gal. and represented a 639-million-gal. increase over '55. Hence the 16.7% sales increase previously estimated for '56 was revised downward to 10.6%.

The preliminary estimate of total LPG sales in '55, however, was considerably more accurate; a gain over '54 estimated at 17.2% was close to the final 17%. But simultaneously reported '55 LPG end-use breakdowns required significant revisions (*CW, Jan. 5, '57, p. 40*).

Similarly, the latest report from Phillips reveals that '56 LPG end-uses again turned out to be far different than expected. Demand for "domestic and motor fuel" uses was estimated at more than 4 billion gal., actually it was just over 3.77 billion gal. The percentage increase was revised to 9.3%—from the expected 17.8%.

Other revisions in '56 LPG end-use estimates: sales for miscellaneous industrial uses amounted to nearly 660 million gal., represented an 18.6% increase over '55 sales. The earlier estimate indicated only a 10.4% boost. Gas manufacture in '56 required little more than 212 million gal. of LPG—a 0.7% drop in sales. A 9.5% gain had been expected.

Requirements for chemical manufacture in '56 were also overestimated. An indicated 20.1% increase in LPG sales for this purpose was later knocked down to 14.9%. Likewise, '56 sales for use in rubber components required downgrading—from an original 8.1% to 2.9%.

Impressive Record in '57? In spite of the numerous downward revisions Phillips analysts were required to make in their evaluation of the enormous and complex LPG market, they still regard '57 as a good year. They weren't disappointed in the 4.1% sales increase in '57—even though this increase was lower than the gains scored in recent years. By way of explanation they note that the LPG industry exhibited better growth than the petroleum industry in general and the nation's economy as a whole. Nonetheless, the industry "can do better," they add, and "indications are that '58 will be an even better growth year for the industry."

Hope for better sales performance in the future is pinned on many potential "load builders" yet to be fully exploited, e.g., crop drying, flame weeding, asphalt heating, aggregate drying, tractor fuel, gas air conditioning.

Chemical Needs: LPG sales in '57

Mono
Oleates
Di

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Diglycol
Ethylene Glycol
Diethylene Glycol
Polyethylene Glycol
Propylene Glycol
Polyoxyethylene
Butoxyethyl
Glycerine

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for use in the manufacture of chemicals increased to more than 1.66 billion gal., a boost of some 6% over '56 sales for this purpose. The increase was the largest racked up in '57 by any single category, but was considerably below the 14.9% gain in '56 and the whopping 30.2% advance made in '55.

Much of the '57 gain was attributed to operation of new facilities in the Gulf Coast and western Texas area, some of which started up in late '56. Most of the increase here was due to the rapid growth of polyethylene capacity—a number of plants having come onstream during '57. Other polyolefin plastics or elastomers, e.g., polypropylene, polybutylenes, polybutadienes, received considerable attention but remained largely in development stages.

Butadiene plants, especially those using normal butane as feed stock, are becoming important producers of petrochemicals in addition to synthetic rubber components, because their operation can be easily modified to yield increased recovery of butylenes and propylenes.

Synthetic detergents required increased quantities of propylene obtained mainly from rich refinery gas streams. Use of LPG in production of intermediates for synthetic fibers also increased; and large volumes were used to make intermediates for the manufacture of styrene.

Smaller but growing outlets for LPG include the manufacture of nitroparaffins, acetylene, hydrogen, phenols, glycols, amines, acetones, various motor fuel and lubricating oil additives. Still quite small, but also promising, is LPG's use as a propellent in aerosol-type containers.

Rubber Components: Use of LPG in the manufacture of synthetic rubber components in '57 was an estimated 426.5 million gal. This amount represented an increase of 2% over '56 sales. By comparison, sales increases of LPG for rubber components amounted to 2.9% in '56, and 32% in '55.

Actual total LPG demand for rubber components might be higher, say the analysts, if it were possible to distinguish between amounts going into manufacture of synthetic rubber and into chemical feedstocks.

U.S. consumption of synthetic rubber went up 8% in '56, compared with '57; the fact that production increased only 2% is attributed to reduction of producer and consumer inventories during the first half of '57.

Other LPG Outlets: Still by far the largest outlet for LPG is the "domestic and motor fuel" category, which reportedly took more than 3.9 billion gal. in '57, a gain of 4.5% over '56 sales. This increase, too, was smaller than those reported in two preceding years, i.e., 9.3% in '56, and 8.8% in '55. House heating continues as the most important factor in growth of "domestic" uses.

Agricultural uses, including crop drying and flame weeding, are expanding, as are requirements for assorted applications, including fuel for tar and asphalt kettles, plumbers' pots.

An estimated 7.9% more LPG was used for motor fuel in '57 than in '56 amounting to a total of some 834.5 million gal. Largest volume users: irrigation pumps, farm tractors, drilling rigs.

Sales of LPG gas appliances and equipment lagged in '57, due partly to a slowdown of new housing starts.

Some 668.9 million gal. of LPG were used in industrial and miscellaneous applications in '57—up 1.4% over the '56 demand. The small increase was attributed to the "leveling-off" trend in industrial activity in '57.

LPG used by gas utilities in '57 was an estimated 203.5 million gal. —down 4.2% from '56 requirements. This decrease—the only one reported in the '57 breakdown—was due to extension of natural gas pipelines.

Supply: Thirty-two new plants came onstream in '57, with a total estimated production capacity of 1.2 million gal./day of LPG. And 23 new plants—with a production capacity of nearly 1.5 million gal.—are scheduled to go into operation in '58. Underground storage facilities, too, have been increased, now total close to 1.4 billion gal. Facilities for storage of an additional 400 million gal. are planned or under construction.

In the light of extensive revisions that were necessary in reports of previous years, the '57 LPG data must be considered only as the best available preliminary estimate. And because the estimated sales increase in '57 is so small, LPG marketers may well hope that this year's preliminary data will prove to be conservative rather than overoptimistic.

D. F. Wicks
New York, N.Y.

W. E. Noble
New York, N.Y.

H. L. Houser
Buffalo, N.Y.

T. C. Splane
New York, N.Y.

R. L. Walters
New York, N.Y.

S. G. Shetter
Middletown, Ohio

J. J. Greene
Louisville, Ky.

M. F. Keane
Cleveland, Ohio

A. P. Wolff
Detroit, Mich.

R. W. Drury
Kansas City, Mo.

R. J. Stevens
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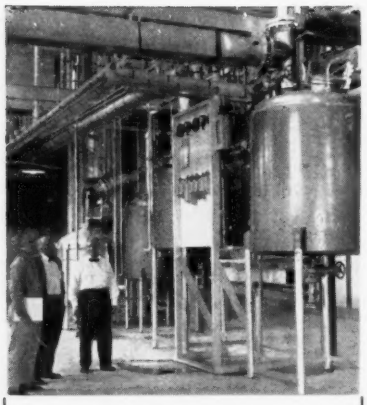

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U.S. Ethylene Glycol Demand

(1956)

Consuming Industry	Consumption (thousand pounds)	Percent Total
Antifreeze	851,562	83.0%
Explosives	28,546	2.8
Cellophane	24,519	2.4
Polyester alkyd and ester gum resins	9,933	1.0
Electrolytic condensers	3,877	0.4
Dealers and distributors	4,499	0.4
Exports	56,804	5.5
Miscellaneous*	46,008	4.5
Total	1,025,748	100.0

* Includes hydraulic fluids, diethylene and higher glycols, polyester fibers, and other chemical synthesis.

Glycol Comes a Gusher

According to figures in a just-released special report prepared by the Chemical and Rubber Division of the U.S. Commerce Dept.'s Business & Defense Services Administration, U.S. glycol production increased by more than 150 million lbs. last year—a 14.6% gain over the near-1.03 billion lbs. turned out in '56. One major factor behind the '57 glycol boom: a huge increase of exports.

Total U.S. ethylene glycol production has almost doubled in the past six years, from about 597 million lbs. in '51 to an estimated near-1.18 billion in '57.

That the boom is expected to continue is indicated by current construction of new and enlarged production facilities. BDSA, through its questionnaire survey, found that total U.S. ethylene glycol capacity at the beginning of '57 amounted to a near-1.37 billion lbs./year. Additional capacity totaling 320.4 million lbs./year is scheduled for completion "after Jan. 1 '58."

Incidentally, U.S. glycol producers were quick to disagree with the consumption for antifreeze use as reported by BDSA (*above*). They say actual use was some 94 million lbs. less than indicated, i.e., about 757 million lbs. The excess, they add, should be listed under the "dealers and distributors" category. Says BDSA in rebuttal: "The producers reported the data, we just added it up, got the higher figure."

Foreign Trade Bonanza: The report makes special note of the lusty increase in '57 of ethylene glycol shipments to foreign buyers. In recent years, BDSA says, shipments have been made to approximately 20 countries in amounts varying from "insignificant quantities" to as much as 20 or 30 million lbs. However, no attempt was made to pinpoint the especially lush foreign market areas (*CW, Sept. 14, '57, p. 93*).

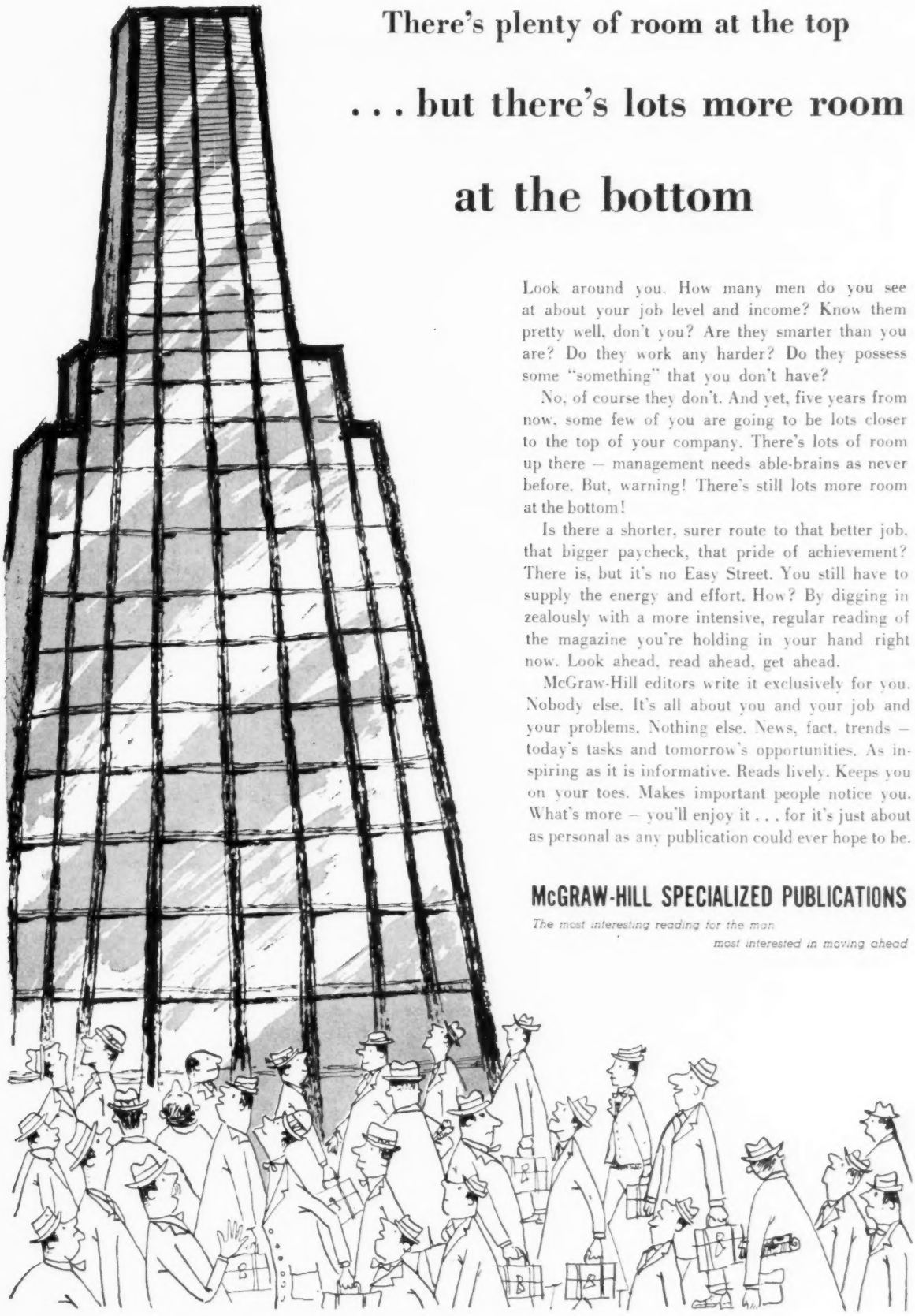
Before '52, the glycol export pattern was erratic; but since then—with the exception of '53—the trend has been steadily upward. Total glycol exports amounted to about 56.8 million lbs. in '56, valued at more than $6 million.

In the first nine months of '57, well over 109 million lbs., worth close to $12.6 million, were exported. If the '57 pace continued, BDSA notes, the total for 12 months would be about 150 million lbs.—a 164% jump.

Until other countries have raw materials and production facilities, the report continues, exports will probably continue at present or higher levels.

There's plenty of room at the top

. . . but there's lots more room at the bottom



Look around you. How many men do you see at about your job level and income? Know them pretty well, don't you? Are they smarter than you are? Do they work any harder? Do they possess some "something" that you don't have?

No, of course they don't. And yet, five years from now, some few of you are going to be lots closer to the top of your company. There's lots of room up there — management needs able-brains as never before. But, warning! There's still lots more room at the bottom!

Is there a shorter, surer route to that better job, that bigger paycheck, that pride of achievement? There is, but it's no Easy Street. You still have to supply the energy and effort. How? By digging in zealously with a more intensive, regular reading of the magazine you're holding in your hand right now. Look ahead, read ahead, get ahead.

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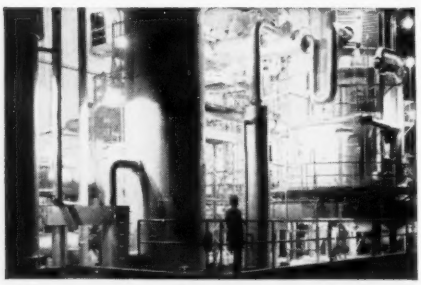

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Carbide's Hulten: Steering a newcomer into fluorocarbon propellents.

General's Robbins: A successful sales policy requires little changing.

Du Pont's Hoopes: Brand-name consciousness will play a key role.

Stepping up Pace of the Refrigerant Race

When the 1958 refrigerant marketing season opens in March, the fluorocarbon sales managers shown on this page will get their first chance to evaluate major new distribution changes.

- Du Pont has abandoned direct sales to equipment wholesalers and has dropped American Potash from its chain of national distributors.
- Pennsalt has now become a supplier to American Potash.
- Union Carbide Chemicals will start setting up its distribution a bit later, readying for production that will begin in the third quarter.
- General Chemical is the only firm not planning changes.

All will be using a new pricing system. And there's definite evidence that a struggle for brand identity is shaping up.

At stake is a market for fluorocarbons now estimated to be 160-170 million* lbs. annually and still growing. It's a market that is now split about equally between aerosols and refrigeration applications (relatively small quantities of fluorocarbons are used as solvents and chemical intermediates). In recent years, aerosols have shown the greatest growth rate. But whether aerosol use will continue to grow and outdistance the consumption for refrigeration use is moot. There are many who feel that a coming boom in air conditioning may bring a spectacular climb in refrigerant sales.

Channel Choice: Changes in fluorocarbon refrigerant distribution are designed to make it possible for firms to cash in on any refrigerant boom without too much alteration of available marketing channels.

Most important channel is the "parts" wholesaler, who accounts for the "replacement charge" market.

Pennsalt's Blitz: For additional market coverage, add American Potash.

Some 600 of them supply spare parts (to service firms) and make about 70% of all fluorocarbon refrigerant sales. Air-conditioning and refrigeration equipment manufacturers make up the remaining "original charge" market.

At the moment, heating and plumbing contractors (increasingly important in equipment installation) aren't in the distribution picture. But if existing channels don't prove adequate, more than one producer is willing to give them a try.

While manufacturers still seek the most effective distribution channels for refrigerants, they've got a simpler task selling the relatively few aerosolers who buy direct. And, until a few weeks ago, aerosolers got the gases more cheaply; recently, there has been a shifted price and credit structure.†

Competitive Lineup: But pricing changes are only part of the new look in refrigerant marketing. Here's how major producers are setting up for the sharpened competition soon to come.

- **Du Pont:** Du Pont has now pared its national distributors to two, Ansul

*Exclusive of Atomic Energy Commission use, captive consumption, exports.

†Aerosol propellent prices will increase 3-5% for "11" and "22" materials and their solutions on Jan. 26. The price on "114" fluorocarbon and its solutions will be slightly reduced. In addition, the discount for payment within 10 on Jan. 26. The price on "14" fluorocarbon will thus be the same for similar quantities, regardless of end-use or container.

Chemical and Virginia Smelting. They will be exclusive agents to the wholesale trade. Du Pont will sell direct only to equipment producers and aerosol loaders. It was this change that caused Du Pont and AP&CC to sever relations.

- AP&CC's distribution network, coverage and sales policies would not mesh smoothly with Du Pont's revamped marketing structure.
- Du Pont's planned intention to beef up brand-preference promotion might conflict with AP&CC's sales approach and possibly with its Charge-a-Can (1- and 2-lb. disposable container) sales.

Moreover, says Du Pont's J. C. Hoopes, field distribution manager for refrigerants, the change will help to eliminate coverage duplication and facilitate Du Pont's brand-preference campaign by enabling selection of wholesalers willing to aggressively participate in it.

Elimination of AP&CC from the Du Pont network, however, leaves it with only Virginia Smelting selling in the 1- and 2-lb. container field. But it's possible that Ansul may plunge into that market.

By its new arrangement, Du Pont sidesteps the pitfalls (example: price cutting) of inadequate distribution control, which is sometimes a problem in agent systems. Du Pont will choose wholesaler accounts for Ansul and Virginia, handle billing, credit and warehousing. The move also takes Du Pont out of competition with its agents for the same business.

But Du Pont will maintain direct contact with its wholesalers. Its field sales staff will turn to building brand loyalty by direct calls, will help wholesalers with a planned program of merchandising and promotional assistance. (One aid: letterheads and stationery.) Salesmen will pick the wholesalers' customers, be responsible also for evaluating wholesaler performance. Salesmen will also promote (but not sell) fluorocarbons to contractors, servicemen and industrial consumers.

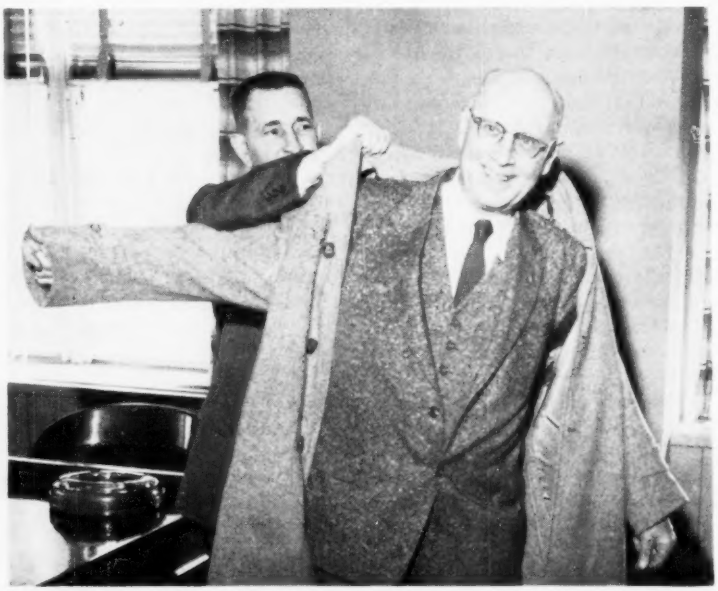
Union Carbide: It's marketing effort will begin late this year, reach high gear in the '59 season. Right now, fluorocarbon sales manager John Hulten is facing all the problems that introduction of a new product brings. The product name, for instance, is yet to be selected. UC is giving some thought to breaking with use of the generic "on" now suffixed to the names of fluorocarbon products (e.g., General's Genetron, Pennsalt's Isotron, Du Pont's Freon).

UC will sell directly to the "original charge" market and possibly to large institutional users. But for "competitive reasons," UC won't say how it plans to penetrate the all-important wholesale trade.

Some trade observers believe UC will sell direct to the wholesaler. Main reason: Carbide already has a proved field distribution system for industrial gases that's comprised of 120 bulk stations, over 1,000 warehouses. That's also a reason why UC probably won't attempt to sell to repackagers, an operation that sometimes introduces quality-control problems.

Hulten anticipates that UC's sales approach will stress its products' technical characteristics and customer and technical service. To that, speculators add the thought that UC may offer something new in delivery service and packaging. Heavy advertising probably won't be a major element of Carbide's sales bid.

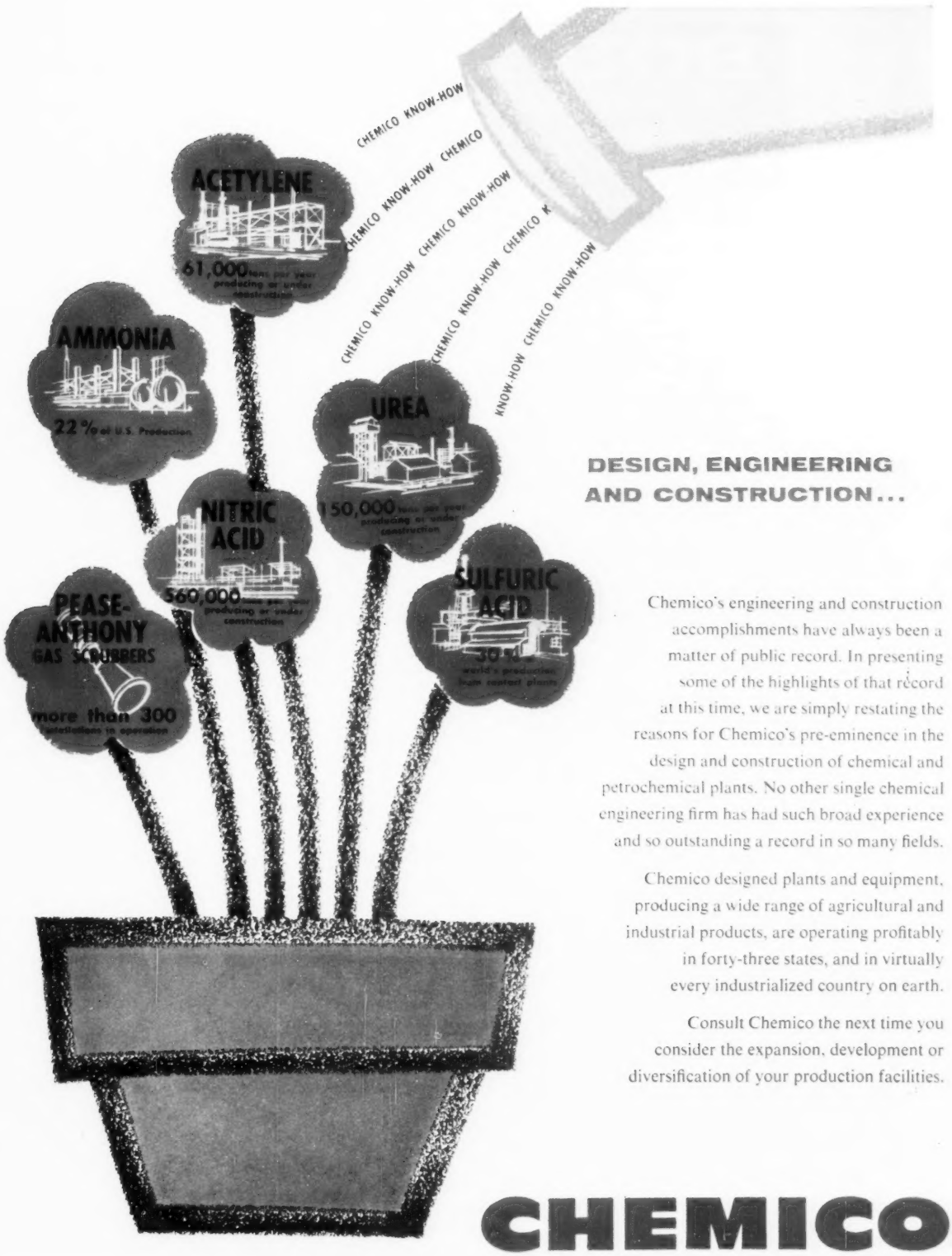
Pennsalt: Like the others, Pennsalt sells (with a few exceptions) directly to equipment manufacturers. Isotron refrigerants sales supervisor Arnold Blitz considers the wholesaler the logical outlet for the "replacement charge" market. It's reached by direct solicitation and selected sales agents. With the exception of newly added AP&CC, the agents rely on Pennsalt for customer selection, inventory and billing. (AP&CC handles its own order-processing and customer selection.) AP&CC will sell only to the wholesaler market, will now use Isotrons in its Charge-a-Can containers. Brand-name promotion will play only a



Wrapping up His 35,000th Call

It's rare that an industrial salesman makes 35,000 sales calls. But that's the record Solvay's Charles Berton set a few days ago when he strode out of a New York purchasing agent's office (Ed Krech's at J. M. Huber Corp.).

The call wrapped up a 54-year career with Solvay and its marketing predecessor, Wing & Evans. Before his retirement this month, Berton devoted part of his time to sales training. To fledgling salesmen, he raps out these three rules: be yourself, radiate enthusiasm and, above all, "never let a purchasing agent ask why. It's a sure way to sidetrack a presentation."



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limited role in Pennsalt's current marketing plans.

General Chemical: Although product identity for its Genetrons is well established, GC will spare no effort to maintain brand recognition in the face of stepped-up Du Pont promotion. GC sells direct, both to the original charge and to wholesaler markets. Almost all refrigeration parts wholesalers, GC claims, now handle its Genetrons.

In the coming sales tussle, GC will make the most of its marketing experience and 37 delivery stock points. And it will continue its extensive merchandising and technical assistance plus "Tip of the Month." But it's unlikely, feels Harold Robbins, wholesale sales manager, that any major policy change will be necessary.

By any standard, the distribution changes and increasing emphasis on brand-name promotion promises a lively '58 selling season. But the big struggle is slated for '59, when the fourth producer—Carbide—enters the market.

Broadening the Base

Midwinter meetings of the Chemical Industries Buyers' Group will start a new tack next month. For the first time, CIBG will hold a joint session with the Chemical Market Research Assn. Long delayed by organizational difficulties, the meeting will get under way at Washington's Sheraton-Park Hotel, Feb. 6.

Market researchers and purchasing agents cover much the same ground in crystal-balling future economic trends. Hence, it's not surprising that the first joint session will emphasize cooperation between the two functions. Tentative program:

- Economic Forecast (H. J. Barnett and F. T. Moore, both of Rand Corp.).
- Long-Range Corporate Planning (E. E. Fogle, Union Carbide Chemicals Co.).
- Cooperation Between Market Research and Purchasing (L. J. Finnan, consultant).
- Exchanging Information Between Market Research and Purchasing (Robert Wier, Hercules Powder Co.).
- Influence of Purchasing and Market Research on "Make-or-Buy" Decisions (Thomas MacGowan, Firestone Tire & Rubber Co.).

Before this joint get-together, CIBG

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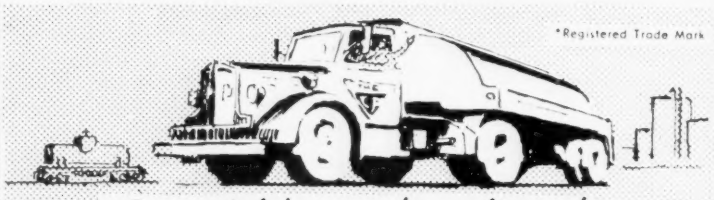

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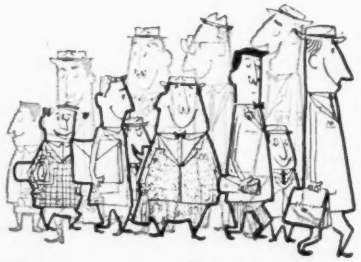

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- **Castor oil:** Booklet discusses 20 derivatives of castor oil useful in urethane modifications, stresses such applications as rigid and flexible foams, elastomers, coatings and adhesives. The Baker Castor Oil Co. (Bayonne, N.J.).
- **Plastic color:** Report shows how plastics are color-matched to other materials by a method proved in more than 38,000 plastic color formulations. Eastman Chemical Products, Inc. (Kingsport, Tenn.).
- **Corn oil:** New booklet contains analytical data on physical and chemical properties of corn oil. Nonfood applications in manufacture of ammunition, insecticides, soap, paint and varnish, and rust-preventive formulations are suggested. Corn Industries Research Foundation Inc. (New York).
- **Plastics:** Lexan polycarbonate resin and other thermoplastic molding materials are compared in a chart that outlines electrical and physical properties as well as molding characteristics. Chemical Division, General Electric Co. (Pittsfield, Mass.).
- **Plasticizer:** Typical analyses and properties of Sole-Onic Pi isopropyl palmitate are discussed in a technical bulletin that suggests its use in skin creams, hair preparations, lipsticks, and hormone or therapeutic products. Sole Chemical Corp. (Chicago).

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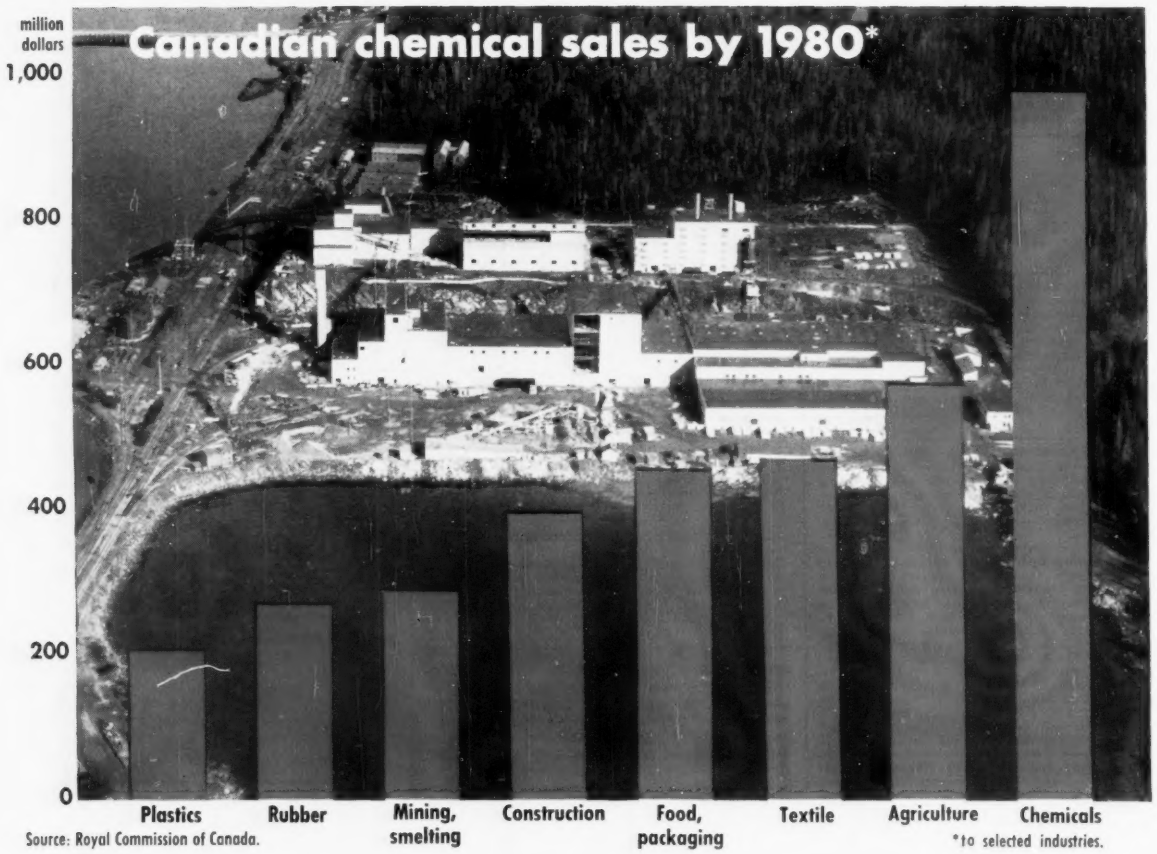

Canada's 1980 Forecast: $5.9 Billion Sales

The recent report by Canada's Royal Commission on Economic Prospects forecasts a booming market for chemicals by 1980—sales of nearly $6 billion.

U.S. chemical firms that hope to get in on this market should note this breakdown: In '80, the chemical industry itself expects to purchase a hefty $972 million worth of chemicals. Agriculture will buy about $572 million worth. The textile industry will need an estimated $466 million worth. Other important chemical buyers in '80: food industry, about $453 million; construction and maintenance, some $395 million; mining, about $285 million.

But U.S. marketers should realize that Canada expects a healthy expansion of its own chemical industry, spurred by two important factors:

- New markets which drugs, insecticides, fertilizers, etc., are opening, not at the expense of other commodities.
- The replacement market gains of synthetic textiles, plastics, detergents, rubber, etc.

In the past, the replacement market was the major factor behind Canadian chemical sales and expansion. But future sales and expansion are expected to be spurred chiefly by new markets.

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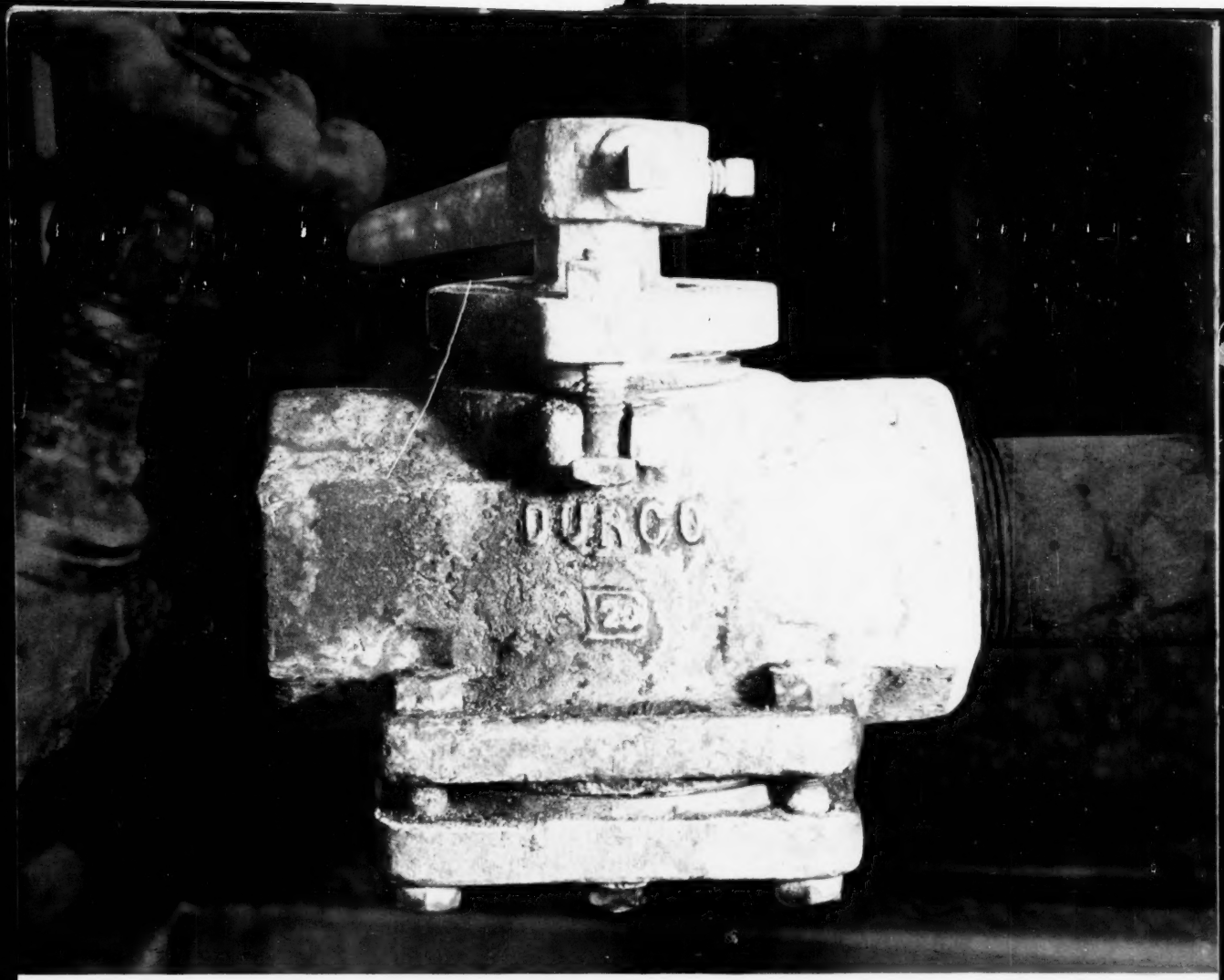

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